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LANDFILL BIOREACTOR PROGRAM 2002 ANNUAL REPORT OF MONITORING ACTIVITIES

MAPLEWOOD RECYCLING AND WASTE DISPOSAL FACILITY AMELIA COUNTY, VIRGINIA VADEQ Solid Waste Permit No. 540

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Project No. ME0275

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1. INTRODUCTION

1.1 Terms of Reference

The purpose of this semi-annual monitoring report is to present the 2002 calendar year results of the Landfill Bioreactor Program at the Maplewood Recycling and Waste Disposal Facility (Maplewood Landfill) in Amelia County, Virginia. The bioreactor study is being performed by Waste Management of Virginia, Inc. (a Waste Management, Inc. (WMI) company) under the United States Environmental Protection Agency's (USEPA's) Project XL program. This monitoring report was prepared for the Virginia Department of Environmental Quality (VADEQ) by Mr. Douglas T. Mandeville and Mr. Michael F. Houlihan, P.E., both of GeoSyntec Consultants (GeoSyntec), in accordance with the internal peer review policy of the firm.

1.2 Project Overview

The Maplewood Landfill is located in Amelia County, Virginia, approximately 30 miles southwest of Richmond, Virginia. The waste disposal area will cover approximately 404 acres upon completion. Construction of the first phases started in 1992; construction of the most recent phase was completed in 2000. The Maplewood Landfill was constructed having a geomembrane composite double-liner system, with primary leachate collection and leak detection (secondary collection) layers. The current configuration Phases 1 through 4 is shown in Figure 1 and Drawing 1. As part of the XL program, Phases 1 and 2 are operated as bioreactors (i.e., leachate is recirculated); whereas Phases 3 and 4 are operated as standard landfill cells (i.e., no leachate is recirculated). Phases 1 and 2 of the Maplewood Landfill are referred to as the test area. Phases 3 and 4 are referred to as the control area. A landfill becomes a bioreactor when leachate and other liquids are added to the landfill. The purposes of operating a landfill as a bioreactor are to increase the rate of biodegradation in the landfill and to facilitate the management of leachate and other waste liquids. The original intent of the program was to recirculate all of the leachate generated at the site, typically between 3 to 4 million gallons per year. WMI will seek to recirculate this amount, and maintain compliance with applicable rules and regulations. At the time the XL program was initially implemented, an increase in the occurrence of leachate seeps was observed, causing site personnel to reduce or curtail recirculation operations. In the interest of maintaining compliance with good landfill operating practices and

environmental protection, the actual amount of leachate recirculated may be less than 4 million gallons per year. The amount of liquid applied to the waste will vary based on site inspections and observations. Regardless of the quantity of leachate recirculated, the requirement to perform monitoring during the course of the program will continue.

It is anticipated that the operation of Phases 1 and 2 as a bioreactor will result in several environmental and cost saving benefits including, but not limited to, the following: (i) decreased leachate management costs; (ii) increased landfill disposal capacity; (iii) reduced period of landfill gas generation; and (iv) improved long-term leachate quality. These benefits are discussed in depth in WMI's Project XL application [GeoSyntec, 2000].

The performance of the landfill is evaluated based on measurements of critical chemical and physical parameters associated with the solids, liquids, and gasses obtained from the test and control areas. Parameters to be measured include: settlement, leachate quantity, and quality, in-place density of waste, and air quality. The parameters measured in the bioreactor (i.e., test area) are compared to similar parameters measured from the control portion of the landfill.

1.3 Monitoring Program

As shown in Table 1, the monitoring activities at the Maplewood Landfill consist of tracking the quality and quantity of leachate, landfill gas, and solid waste in the test and control areas. Detailed monitoring activities for the Landfill Bioreactor Program are described in the document entitled, *"Monitoring, Sampling, and Analysis Plan"* (Monitoring Plan) [GeoSyntec, 2001]. which is contained in the permit application submitted to VADEQ. As part of the USEPA XL program and VADEQ permit requirements, a series of site-specific rules and monitoring requirements have been developed. The USEPA site-specific rule appeared in the Federal Register on 18 July 2002; these requirements are addressed in Section 2 of this report. The VADEQ site-specific permit requirements appeared in the state permit modification issued for the site on 18 July 2002; these requirements are addressed in Section 3 of this report. Table 1 also shows the schedule followed for the 2002 monitoring events; Table 2 summarizes the dates and sampling events that occurred in 2002. The purpose of the leachate monitoring events is to collect leachate samples from the control area and the test area for subsequent laboratory analysis. The purpose of the landfill gas monitoring events is

to measure the landfill gas composition at the wellheads in the control and test areas, obtain landfill gas composition samples from the landfill gas collection system, and perform a surface scan to measure surface emissions. The purpose of the solid waste monitoring events is to obtain waste samples for subsequent laboratory analysis. In addition to these field monitoring events, leachate collection records, liquid application records, and landfill settlement are monitored.

The purpose of the monitoring program is to evaluate the performance of the landfill bioreactor throughout the duration of the project. The evaluation is based on the following performance criteria:

- leachate quality and quantity;
- landfill gas quality and quantity; and
- solid waste decomposition/stabilization.

The manner in which these criteria are being evaluated is described in the following three subsections.

Leachate Quality and Quantity

Sampling activities were conducted in both the test area and control area, allowing for the anticipated relative improvement in performance of the bioreactor to be evaluated. Leachate sampling was conducted in Phases 1, 2, 3, 4, and at the leachate storage tank, according to the frequency described in Table 1. Leachate samples were collected by filling the appropriate sample bottles directly from the sampling ports from the primary leachate collection system for the respective phase being sampled. The sampling ports for each of the primary leachate collection systems are located within the vault/riser house of the leachate collection system for each phase. The specific parameters measured, and the associated test methods, are provided in Table 3. Several key parameters that indicate the waste composition and the presence of biological processes in the landfill have been identified (Pohland and Harper, 1986) and are presented in detail in this report. These parameters include: (i) Biological Oxygen Demand (BOD); (ii) Chemical Oxygen Demand (COD); (iii) Total Organic Carbon (TOC); (iv) Chloride; (v) Sulfate; (vi) Nitrate Nitrogen; and (vii) Ammonia Nitrogen.

In addition to evaluating the leachate quality in the landfill over time, the amount of liquid added to the leachate recirculation trenches and the amount of leachate collected in the leachate collection sumps was recorded.

Landfill Gas Quality and Quantity

Measurements of landfill gas quality were obtained from field monitoring events at existing landfill gas probes, as part of the surface emissions monitoring, and the collection of composite landfill gas samples from the landfill gas collection system. The parameters measured and the test methods for the landfill gas monitoring and sampling are described in the Monitoring Plan [GeoSyntec, 2001].

Landfill gas monitoring was performed at each of the existing landfill gas wells to monitor activity within the test and control areas. Measurements of methane (CH_4), oxygen (O_2), carbon dioxide (CO_2), temperature, and flow rate were obtained from each gas well using portable field instruments, (i.e., a Landtech, Inc., GEM 500). Hydrogen sulfide (H_2S) measurements were obtained using a GasTech GT-2 Hydrogen sulfide detector.

Surface emissions monitoring was performed in accordance with the requirements specified by the New Source Performance Standards (NSPS) and Emissions Guidelines (EG) for MSW landfills [40 CFR 60.755]. Methane concentrations were measured within 5 to 10 centimeters (2 to 4 inches) from the landfill surface in the test and control areas.

Composite landfill gas samples were obtained from the landfill gas collection system. These landfill gas samples, obtained for non methane organic compounds (NMOCs), were obtained in accordance with the requirements of USEPA Method 25 and samples obtained for volatile organic compounds were obtained in accordance with USEPA Method TO-14.

Solid Waste Decomposition/Stabilization

To evaluate the composition of the solid waste, a series of borings were drilled in the test and control areas in 2001. Samples of the solid waste were obtained from these borings. The parameters evaluated from these solid waste samples include: (i) moisture content; (ii) cellulose; (iii) lignin; (iv) pH; and (v) biochemical methane potential.

To evaluate waste settlement in both the test area and the control area, a series of topographic surveys of the test and control areas were conducted.

1.4 Report Organization

In this report, the results of the analytical tests conducted during calendar year 2002 will be provided. The organization of this report is described below.

- Section 2 addresses the Federal register site specific rule making.
- Section 3 presents the requirements of VADEQ Experimental Permit.
- Section 4 describes the sampling and sampling and analysis activities performed during calendar year 2002.
- Section 5 describes the analytical test results and other data collected during the 2002 calendar year.
- Section 6 presents closing comments.
- Section 7 provides references.
- Appendix A presents the leachate laboratory analysis results.
- Appendix B presents the liquid application logs.
- Appendix C presents the trench monitoring logs.
- Appendix D presents the landfill settlement data.
- Appendix E presents landfill gas data.

2. REQUIREMENTS OF FEDERAL REGISTER SITE SPECIFIC RULE MAKING

On July 18, 2002, the EPA promulgated a site-specific rule to implement this project under the EPA's Project Excellence and Leadership Program (Project XL). This rule was published in the Federal Register and provides site-specific regulatory flexibility under the Resource Conservation and Recovery Act (RCRA) for the Maplewood Landfill. Part 258, Subpart D of the rule identifies 14 conditions that are to be met while leachate is recirculated at Maplewood. The remainder of this section addresses 12 of these conditions; the remaining two conditions are related to the duration of and compliance with the site specific rule.

1) *Item 1 relates to the integrity of the liner system and maintaining less than 30 cm of head on the liner system.* In accordance with Item 1, the integrity of the liner system was maintained during construction of the recirculation trenches and the leachate collection system has been maintained in good operating order. To date, the leachate collection records in the test and control area do not indicate an increase in the leakage rate through the primary liner system. There is no apparent slippage of the liner system based on daily observations at the site. It should be noted that design calculations estimating the amount of head on the liner system indicated that up to 3 to 4 million gallons of liquid per year could be added to the waste mass and that the head on the liner system would remain less than 30 cm. The liquid application rate is approximately 2 million gallons per year based on data between August 20, 2002 and December 31, 2002. Therefore, the head on the liner system is expected to be less than 30 cm.

2) *Item 2 relates to the Code of Federal Regulations (CFR) Section 258.40.* In accordance with Item 2, the groundwater quality has been monitored and analyzed at the compliance point. Arsenic, Cadmium, and Lead have been detected at concentrations that exceed the current MCL; however, it is noted that the detected concentrations were less than the facility background concentrations at the time of detection. Consequently, the concentrations did not represent statistically significant concentrations and the monitoring program at the Maplewood Landfill, Permit No. 540, was allowed to continue in the Detection Monitoring Program.

3) *Item 3 relates to the occurrence of seeps at the landfill.* In accordance with Item 3, surface seeps have occurred at the Maplewood Landfill after leachate recirculation operations started. These seeps are most likely attributed to the leachate recirculation operations at the site. WMI is in the process of identifying operating procedures that minimizes the occurrence of seeps. Because WMI will operate Maplewood in an environmentally responsible manner, the amount of leachate that is recirculated may need to be reduced. Hence, the actual amount of leachate recirculated may be less than the target amount of 4 million gallons per year.

4) *Item 4 relates to the leachate quality parameters to be analyzed as part of this project.* In accordance with Item 4, the evaluation of the key leachate quality parameters occurred at the frequency presented in the Final Project Agreement [GeoSyntec, 2000] and the VADEQ state permit [GeoSyntec, 2001]. The test results are discussed in Section 5.1. It should be noted that these parameters (or groups of parameters) have been analyzed in leachate samples collected from the test and control areas. A complete set of laboratory results in presented in Appendix A (hard copies are available upon request).

5) *Item 5 relates to the quantity of leachate applied to the test area and the amount of leachate collected in the test and control areas of the landfill.* These issues are discussed in Section 5.1.

6) *Item 6 relates to an initial characterization of the liquid that was added to the test area.* In accordance with Item 6, an initial characterization of the leachate added to the landfill was performed in August 2002. The results of this characterization are discussed in Section 5.1. In 2002, leachate was the only liquid added to the test area at Maplewood.

7) *Item 7 relates to the occurrence of landfill fires in the test area and the measurement of gas temperature at the wellheads.* In accordance with Item 7, the test area at Maplewood has been operated in a manner to prevent landfill fires from occurring. The gas temperature at the wellheads is discussed in Section 5.2.

8) *Item 8 relates to topographic surveys at the site.* In accordance with Item 8, two topographic surveys were performed in 2002. The first survey was conducted in August 2002; the second survey was conducted in October 2002. The difference in ground surface elevation between these two surveys was used to calculate settlement. Settlement of the test and control areas is discussed in Section 5.3.

9) *Item 9 relates to odor complaints resulting from liquid application events.* No odor complaints associated with the liquid application events were recorded at Maplewood.

10) *Item 10 relates to an initial waste characterization in the test area of the landfill.* In accordance with Item 10, a total of 5 borings were drilled in the summer of 2001. Three of these borings were in the control area and two were in the test area. The results of the laboratory testing of these solid waste samples are discussed in Section 5.3.

11) *Item 11 relates to the preparation of semi-annual reports to the EPA Regional Administrator.* In accordance with Item 11, this report serves as the first semi-annual monitoring report. The second report will be submitted on July 18th, 2003.

12) *Item 11 relates additional monitoring related to the landfill gas.* In accordance with Item 11, the monitoring requirements for the New Source Performance Standards and the Title V Air Permit for the site were met. Copies of the wellhead monitoring results and the surface scans are presented in Appendix E.

3. REQUIREMENTS OF VADEQ EXPERIMENTAL PERMIT

On 18 July 2002, the state issued a permit modification allowing bioreactor operations in Phases 1 and 2 at the Maplewood Landfill. Permit module I.F. of the permit amendment issued 18 July 2002 identifies several site specific conditions that must be met while leachate is recirculated at Maplewood. The remainder of this section addresses each of these conditions.

1) *Item I.F.1 relates to the issuance of a Certificate to Operate.* Construction of the liquid application trenches was completed within 180 days of the issuance of the permit amendment. A renewal letter to continue recirculation operations will be submitted in July 2003.

2) *Item I.F.2 relates to the expiration of the experimental permit and request for a full permit amendment.* This report presents the first 4 months of bioreactor operations. At this time, there is not enough data available to draw conclusions from the experiment. If the project is found to be a success, WMI anticipates submitting a request for a full permit amendment.

3) *Item I.F.3 relates to the permitted landfill bioreactor area, Phases 1 and 2.* In accordance with the permit requirements, the liquid application trenches were constructed in Phases 1 and 2, and liquid was applied only in this part of the landfill.

4) *Item I.F.4 relates to the monitoring, sampling, and reporting requirements.* In accordance with Item I.F.4, the monitoring was completed as identified in Permit Attachment IIB-2. This report serves as the first quarterly report; the next quarterly report will be provided in May 2003.

5) *Item I.F.5 relates to the Title V Air Permit Issued January 10, 2002 and the New Source Performance Standards Subpart WWW.* In accordance with Item I.F.5, WMI complied with the regulations identified in the Title V Air Permit and the New Source Performance Standards Subpart WWW.

6) *Item I.F.6 relates to the characterization of leachate as a hazardous waste and the Virginia Hazardous Waste Management Regulations (9 VAC 20-60-*

10). In accordance with Item I.F.6, WMI managed leachate as required by the Virginia Hazardous Waste Management Regulations.

7) *Item I.F.7 relates to the monitoring of leachate head over the liner at its lowest disposal point to ensure that no more than 1 foot of head of leachate accumulated over the liner.* In accordance with Item I.F.7, WMI monitored the hydraulic head in Phases 1 and 2 at Maplewood. The hydraulic head in Phases 1 and 2 did not exceed 12 inches during the monitoring period.

8) *Item I.F.8 relates to the closure of the bioreactor landfill area.* At this time, WMI plans to continue bioreactor operations in Phases 1 and 2 and Maplewood. In accordance with Item I.F.8, WMI will notify VADEQ at least 180 days prior to the anticipated date of closing.

4. SAMPLING AND ANALYSIS ACTIVITIES

4.1 Introduction

The overall monitoring and sampling program was implemented by GeoSyntec with sampling performed by Joyce Engineering (Joyce), Golder Associates (Golder) and WMI site personnel.

4.2 Field Sampling Activities

4.2.1 Leachate Quality

Leachate samples from the test and control areas were obtained by Joyce on the dates presented in Table 2. The leachate samples were collected from sumps in Phases 1, 2, 3, and 4, and the leachate storage tank. The leachate samples were collected using the field sampling procedures described in the Monitoring Plan contained in the permit application for leachate recirculation at the site [GeoSyntec, 2001].

4.2.2 Landfill Gas Quality and Quantity

The landfill gas samples were collected using the procedures described in the Monitoring Plan contained in the permit application for leachate recirculation at the site [GeoSyntec, 2001]. Drawing 2 shows the landfill gas monitoring plan. These activities were conducted by Golder on the dates presented in Table 2. The landfill gas composition at the wellheads in the test and control areas were tested for the percentages of oxygen, carbon dioxide, methane, flow rate, and temperature. The landfill gas composition at the well heads is summarized in Table 4. A surface emissions scan was conducted in the test and control areas, and a series of composite landfill gas samples were obtained from the landfill gas collection system.

4.2.3 Waste Sampling

Prior to construction of the leachate recirculation system, a series of exploratory borings were drilled in both the test and control areas. Samples of solid waste were collected from a variety of depths at each boring location.

4.3 Laboratory Analysis Program

4.3.1 Leachate Quality

The leachate samples obtained during the field sampling were sent to Geochemical Testing, Inc., and were tested for the parameters listed in Table 3. A summary of the key parameters identified in Section 1.3 are presented in Table 5. Also included in Table 5 are the parameters listed in the Federal Register site-specific rule (i.e., wet chemistry parameters, heavy metals, and common ions). The test results for the organic priority pollutants are not anticipated to indicate the overall performance of the test area and are not presented in Table 5 at this time. Copies of the laboratory analytical results are presented in Appendix A.

4.3.2 Landfill Gas Quality

The landfill gas samples from the header pipes in the landfill gas collection system were sent to Triangle Environmental Services for laboratory analysis. These landfill gas samples were tested in accordance with USEPA Method TO-14. Copies of these results are presented in Appendix D.

4.4 Other Data

4.4.1 Leachate Generation Quantities

Leachate flow was measured weekly in Phases 1, 2, 3, 4, 11, and 12, by site personnel using flowmeters that are installed in the leachate riser vaults near each cell. The leachate generation quantities for each phase are presented in Table 6.

4.4.2 Quantity of Liquid Applied to Landfill

The amount of liquid added to each trench was recorded by site personnel. In general, liquid was added to each trench approximately every 3 days. A summary of the liquid added to the landfill is presented in Table 7.

4.4.3 Landfill Settlement

A series of topographic surveys of the test and control areas have been performed by Flora Surveying. An approximately 100-ft grid system was established, with the elevation measured at the same locations over time. A summary table containing the point number, northing, easting, and elevations at different survey times is presented in Table 8. Drawing 3 shows the settlement monitoring plan.

5. DATA ANALYSIS

5.1 Leachate Quality and Quantity

Liquid application at the Maplewood Landfill commenced on 20 August 2002. During 2002, leachate was the only liquid added to the test area. Figure 2 shows the liquid added to the landfill, the target rate of 4 million gallons per year (333,333 gallons per month or 6,500 gallons per day), as well as the amount of leachate collected in the test and control areas. The total amount of leachate applied to the landfill during 2002 was 864,282 gallons. Starting in mid November and continuing through December 2002, the liquid application occurred at a slower rate due to problems with pumping liquid from the storage tank to the trucks. Prior to that time, the liquid rate of liquid application to the system was close to the target of 4 million gallons per year.

The amount of leachate collected in the test and control areas during the operation of the liquid application system (a four month time period) was 77,134 and 440,729 gallons, respectively. It should be noted that the average monthly leachate collection rates for the test and control areas was 15,720 gallons and 102,000 gallons, respectively. Figure 2 also indicates that more leachate is being collected in the control area than in the test area. It should be noted that the outward facing side slopes in the test area have been capped with the final cover system, limiting the amount of infiltration and subsequent leachate generation.

In examining Figure 2, there does not appear to be a correlation between the liquid applied to the landfill and the leachate collected in the leachate collection system. This indicates that, at the time, the waste in the test area had not yet reached its absorptive capacity.

Because the program is still in its initial stages, there is not enough data to identify any trends in the leachate quality results. However, in reviewing the key leachate parameters in Table 5, several items are apparent. The analyses of the background leachate quality samples (dated August 12, 2002) are within typical ranges for landfill leachate. The monthly leachate samples (dated September, October, and November) in both the test and control areas indicate a biological oxygen demand (BOD) value in the lower ranges of typical landfill leachate (typical values range from 20 mg/l to 35,000 mg/l, [Kjeldsen et al., 2002]).

Figures 3 through 7 show variation with time in the BOD to COD ratio, COD to TOC ratio, Chloride, Nitrate Nitrogen, and Ammonia Nitrogen, respectively. These figures represent the variation in the key leachate parameters identified in Table 5. Because of the limited amount of data collected so far, trends in the data cannot be identified.

5.2 Landfill Gas Quality and Quantity

Table 4 summarizes the landfill gas composition and temperature measured at the wellheads. The wellheads are identified as being located in the test or control areas. The temperatures measured at the wellheads are within normal ranges; this indicates that there are no landfill fires within the test or control areas.

The trends in the landfill gas quantity for the gas wells in the test and control areas are shown in Figure 8. Several of the gas wells in the test area (i.e., Wells 3, 4, 6, and 7), and gas wells in the control area (i.e., Wells 16 and 17) show an increase in the flow rate. Because this trend is noted for wells in both the test and control areas, therefore, increase in landfill gas quantity does not appear to be related to bioreactor operations at this time.

Figure 9 shows the percentage methane in the landfill gas at the wells in the test and control areas. There appears to be a slight general increase in percentage methane present in all of the wells with the exception of Wells 3 and 4, which are both located in the test area. At this time, there does not appear to be a clear difference between the percentage methane present in the landfill gas in the test or control areas.

Figure 10 shows the percentage carbon dioxide in the landfill gas at the wells in the test and control areas. There appears to be a general decrease in the percentage carbon dioxide present in all of the wells, with the exception of Well 16. At this time, there does not appear to be a clear difference between the percentage carbon dioxide present in the landfill gas in the test and control areas.

5.3 Solid Waste

Table 9 summarizes the baseline solid waste sampling results from the field work conducted in the summer of 2001. These results appear to be fairly typical for MSW. Future comparisons will be made as subsequent solid waste samples are obtained from the test and control areas.

Drawing 4 presents the settlement contours for both the test and control areas. These contours are based on the data presented in Table 8 and show the difference in grade between the initial background survey on 2 August 2002 and a following survey on 24 October 2002. The values range from no settlement to approximately half of a foot of settlement. In examining Drawing 4, it appears that settlement in the control area is larger than in the test area. Considering the relatively short timeframe over which these contours are based, this may not be indicative of the performance of the bioreactor system but the result of waste compression in the relatively newer portions of the landfill (i.e., the control area).

6. CONCLUSIONS

This report provides a summary of the monitoring activities at the Maplewood Landfill as part of the leachate recirculation operations conducted under the USEPA's XL Program. Because the program is in its initial stages, conclusions regarding the performance of the test area at the Maplewood Landfill cannot be made at this time. However, based on the experience gained during the design, permitting, and construction processes, the following comments are offered.

- The cost and operational benefits of bioreactor technology can be substantial at sites that either transport leachate from the site or have a high cost of leachate treatment. The direct cost savings at these bioreactor test sites, for example, have been sufficient to pay for the entire capital cost of the program in the first year, as well as first-year operational costs. In addition, indirect cost benefits are expected in the future as decomposition-induced settlement provides additional disposal capacity.
- Bioreactor or leachate recirculation operations should be phased-in at sites to allow the operator to adjust to the specific requirements for operating the system. For example, specific attention is required each day to operation of the liquid application system; for large sites that recirculate all of the leachate generated, this could require as much as one-half to one full laborer each day.
- Careful attention is required during system start-up to minimize or eliminate that problems are not encountered, such as leachate seeps or odors. Because waste composition varies from location to location, calculation of leachate recirculation rates should be used for preliminary trench sizing. The performance of liquid application trenches should be determined by in-situ observation.

A summary of the planned 2003 monitoring events is presented in Table 10.

7. REFERENCES

GeoSyntec Consultants "*Project XL – Final Project Agreement for Landfill Bioreactor Systems – King George County Landfill and Recycling Center and Maplewood Recycling and Waste Disposal Facility*", dated 28 September 2000.

GeoSyntec Consultants "Landfill Bioreactor Project Application for Permit Amendment for Experimental Permit," Maplewood Recycling and Waste Disposal Facility, dated 19 September 2001.

Kjeldsen, P., Barlaz, M.P., Rooker, A.P., Baun, A., Ledin, A., and Christensen, T.H., "*Present and Long-Term Composition of MSW Landfill Leachate: A Revie*w", Critical Reviews in Environmental Science and Technology, 32 (4), p. 297-336.

Pohland, F.G., and Harper, S.R., 1986, "*Critical Review and Summary of Leachate and Gas Production From Landfills*", EPA/600/2-86/073, U.S. Environmental Protection Agency, Cincinnati, Ohio.

Title 40, Code of Federal Regulations, Part 60.

TABLE 1
2002 MONITORING CALENDAR
Project XL
Maplewood Recycling and Waste Disposal Facility
Ameila County, Virginia

	Monitoring Parameters	Responsible Party	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1. LEACHATE	Chemical parameters measured on site	WM personnel								B	X	X	X	X
	Physical parameters measured on site	WM personnel								B	X	X	X	X
	Chemical parameters sampled on site from test area	Sampled by subcontractor, tested offsite by Geochemical								B	X	X	X	X
	Chemical parameters sampled on site from storage tanks	Sampled by subcontractor, tested offsite by Geochemical								B	X			X
2. LANDFILL GAS	Landfill gas composition measured	WM personnel								B	X	X	X	X
	Physical parameters measured on site	WM personnel								B	X	X	X	X
	Chemical parameters	WM personnel, testing by subcontractor								B	X			X
	Surface landfill gas measured on site	Subcontractor								B	X			X
3. SOLID WASTE	Survey, on site	Subcontractor								B	X		X	
	Solid waste stabilization and decomposition	WM personnel								B	X			

TABLE 2
SUMMARY OF SAMPLING ACTIVITIES
Project XL
Maplewood Recycling and Waste Disposal Facility
Amelia County, Virginia

Date	Sampling Event
8/2/2002	Topographical site survey
8/12/2002	Background leachate and landfill gas sampling
9/12/2002	Monthly landfill gas sampling
9/13/2002	Monthly leachate sampling
10/17/2002	Monthly landfill gas sampling
10/24/2002	Topographical site survey
10/28/2002	Monthly leachate sampling
11/20/2002	Monthly leachate sampling
11/21/2002	Monthly landfill gas sampling
12/18/2002	Monthly landfill gas sampling
12/20/2002	Monthly leachate sampling

TABLE 3
LEACHATE ANALYSIS PARAMETERS
Project XL
Maplewood Recycling and Waste Disposal Facility
Amelia County, Virginia

Parameter	Method	Parameter	Method
Cadmium	EPA 200.7	Bromochloromethane	EPA 8260B
Potassium	EPA 200.7	Bromomethane	EPA 8260B
Chloride	EPA 325.2	Carbon Disulfide	EPA 8260B
Ammonia Nitrogen	EPA 350.1	Carbon Tetrachloride	EPA 8260B
Total Kjeldahl Nitrogen	EPA 351.3	Chlorobenzene	EPA 8260B
Nitrate Nitrogen	EPA 353.2	Chlorodibromomethane	EPA 8260B
Phosphorus, ortho	EPA 365.2	Chloroethane	EPA 8260B
Phosphorus, total	EPA 365.2	Chloromethane	EPA 8260B
Sulfate	EPA 375.4	cis-1,2-Dichloroethene	EPA 8260B
Arsenic	EPA 6010 B	cis-1,3-Dichloropropene	EPA 8260B
Barium	EPA 6010 B	Dibromomethane	EPA 8260B
Chromium	EPA 6010 B	Dichlorobromomethane	EPA 8260B
Lead	EPA 6010 B	Dichlorodifluoromethane	EPA 8260B
Selenium	EPA 6010 B	Ethyl Methacrylate	EPA 8260B
Silver	EPA 6010 B	Ethylbenzene	EPA 8260B
Mercury	EPA 7470	Iodomethane	EPA 8260B
1,2-Dibromo-3-chloropropane	EPA 8011	Methacrylonitrile	EPA 8260B
1,2-Dibromoethane	EPA 8011	Methyl Ethyl Ketone	EPA 8260B
1,1,1,2-Tetrachloroethane	EPA 8260B	Methyl methacrylate	EPA 8260B
1,1,1-Trichloroethane	EPA 8260B	Methylene Chloride	EPA 8260B
1,1,2,2-Tetrachloroethane	EPA 8260B	Propionitrile	EPA 8260B
1,1,2-Trichloroethane	EPA 8260B	Styrene	EPA 8260B
1,1-Dichloroethane	EPA 8260B	Tetrachloroethene	EPA 8260B
1,1-Dichloroethene	EPA 8260B	Toluene	EPA 8260B
1,1-Dichloropropene	EPA 8260B	Total Xylene	EPA 8260B
1,2,3-Trichloropropane	EPA 8260B	trans-1,2-Dichloroethene	EPA 8260B
1,2-Dichlorobenzene	EPA 8260B	trans-1,3-Dichloropropene	EPA 8260B
1,2-Dichloroethane	EPA 8260B	trans-1,4-Dichloro-2-butene	EPA 8260B
1,2-Dichloropropane	EPA 8260B	Tribromomethane	EPA 8260B
1,3-Dichlorobenzene	EPA 8260B	Trichloroethene	EPA 8260B
1,3-Dichloropropane	EPA 8260B	Trichlorofluoromethane	EPA 8260B
1,4-Dichlorobenzene	EPA 8260B	Trichloromethane	EPA 8260B
2,2-Dichloropropane	EPA 8260B	Vinyl Acetate	EPA 8260B
2-chloro-1,3-butadiene	EPA 8260B	Vinyl Chloride	EPA 8260B
2-Hexanone	EPA 8260B	1,2,4,5-Tetrachlorobenzene	EPA 8270C
2-Methyl-1-propanol	EPA 8260B	1,2,4-Trichlorobenzene	EPA 8270C
3-Chloro-1-Propene	EPA 8260B	1,3-Dinitrobenzene	EPA 8270C
4-Methyl-2-Pentanone	EPA 8260B	1,4-Naphthoquinone	EPA 8270C
Acetone	EPA 8260B	1-Naphthylamine	EPA 8270C
Acetonitrile	EPA 8260B	1-Nitrosopiperidine	EPA 8270C
Acrolein	EPA 8260B	2,3,4,6-Tetrachlorophenol	EPA 8270C
Acrylonitrile	EPA 8260B	2,4,5-Trichlorophenol	EPA 8270C
Benzene	EPA 8260B	2,4,6-Trichlorophenol	EPA 8270C

TABLE 3 (continued)
LEACHATE ANALYSIS PARAMETERS

Parameter	Method	Parameter	Method
Benzene	EPA 8260B	2,4,6-Trichlorophenol	EPA 8270C
2,4-Dichlorophenol	EPA 8270C	Dibenzofuran	EPA 8270C
2,4-Dimethylphenol	EPA 8270C	Diethyl Phthalate	EPA 8270C
2,4-Dinitrophenol	EPA 8270C	Dimethoate	EPA 8270C
2,4-Dinitrotoluene	EPA 8270C	Dimethyl Phthalate	EPA 8270C
2,6-Dichlorophenol	EPA 8270C	Di-N-Butyl Phthalate	EPA 8270C
2,6-Dinitrotoluene	EPA 8270C	Di-N-Octylphthalate	EPA 8270C
2-Acetylaminofluorene	EPA 8270C	Di-n-propylnitrosamine	EPA 8270C
2-Chloro-Naphthalene	EPA 8270C	Diphenylamine	EPA 8270C
2-Chlorophenol	EPA 8270C	Disulfoton	EPA 8270C
2-Methyl-4,6-dinitrophenol	EPA 8270C	Ethyl Methanesulfonate	EPA 8270C
2-Methylnaphthalene	EPA 8270C	Famphur	EPA 8270C
2-Naphthylamine	EPA 8270C	Fluoranthene	EPA 8270C
2-Nitroaniline	EPA 8270C	Fluorene	EPA 8270C
2-Nitrophenol	EPA 8270C	Hexachlorobenzene	EPA 8270C
3,3-Dichlorobenzidine	EPA 8270C	Hexachlorobutadiene	EPA 8270C
3,3'-Dimethylbenzidine	EPA 8270C	Hexachlorocyclopentadiene	EPA 8270C
3-Methylcholanthrene	EPA 8270C	Hexachloroethane	EPA 8270C
3-Nitroaniline	EPA 8270C	Hexachloropropene	EPA 8270C
4-Aminobiphenyl	EPA 8270C	Indeno(1,2,3-cd)pyrene	EPA 8270C
4-Bromophenylphenylether	EPA 8270C	Isodrin	EPA 8270C
4-Chloro-3-methylphenol	EPA 8270C	Isophorone	EPA 8270C
4-Chloroaniline	EPA 8270C	Isosafrole	EPA 8270C
4-Chlorophenylphenylether	EPA 8270C	m,p-Cresol	EPA 8270C
4-Nitroaniline	EPA 8270C	Methapyrilene	EPA 8270C
4-Nitrophenol	EPA 8270C	Methyl Methanesulfonate	EPA 8270C
5-Nitro-o-toluidine	EPA 8270C	Methyl Parathion	EPA 8270C
7,12Dimethylbenz(a)-anthracene	EPA 8270C	Naphthalene	EPA 8270C
Acenaphthene	EPA 8270C	Nitrobenzene	EPA 8270C
Acenaphthylene	EPA 8270C	N-Nitrosodibutylamine	EPA 8270C
Acetophenone	EPA 8270C	N-Nitrosodiethylamine	EPA 8270C
Anthracene	EPA 8270C	n-Nitrosodimethylamine	EPA 8270C
Benzo(a)anthracene	EPA 8270C	n-Nitrosodiphenylamine	EPA 8270C
Benzo(a)pyrene	EPA 8270C	N-Nitrosomethylethylamine	EPA 8270C
Benzo(b)fluoranthene	EPA 8270C	N-Nitrosopyrrolidine	EPA 8270C
Benzo(ghi)perylene	EPA 8270C	o,o,o-Triethylphosphothioate	EPA 8270C
Benzo(k)fluoranthene	EPA 8270C	o-Cresol	EPA 8270C
Benzyl Alcohol	EPA 8270C	o-Toluidine	EPA 8270C
bis(2-Chloroethoxy)methane	EPA 8270C	Parathion	EPA 8270C
bis(2-Chloroethyl)ether	EPA 8270C	p-Dimethylaminoazobenzene	EPA 8270C
bis(2-Chloroisopropyl)ether	EPA 8270C	Pentachlorobenzene	EPA 8270C
bis(2-Ethylhexyl)phthalate	EPA 8270C	Pentachloronitrobenzene	EPA 8270C
Butyl benzylphthalate	EPA 8270C	Phenacetin	EPA 8270C
Chlorobenzilate	EPA 8270C	Phenanthrene	EPA 8270C
Chrysene	EPA 8270C	Phenol	EPA 8270C

TABLE 3 (continued)
LEACHATE ANALYSIS PARAMETERS

Parameter	Method	Parameter	Method
Diallate	EPA 8270C	Phorate	EPA 8270C
Dibenzo(a,h)anthracene	EPA 8270C	p-Phenylenediamine	EPA 8270C
Pronamide	EPA 8270C	Endrin Aldehyde	EPA 8081
Pyrene	EPA 8270C	Gamma BHC (Lindane)	EPA 8081
Safrole	EPA 8270C	Heptachlor	EPA 8081
sym-Trinitrobenzene	EPA 8270C	Heptachlor epoxide	EPA 8081
Thionazin	EPA 8270C	Methoxychlor	EPA 8081
Chemical Oxygen Demand	HACH 8000	Toxaphene	EPA 8081
Total dissolved solids	SM 2540C	2,4,5-T	EPA 8151A
Nitrite Nitrogen	SM 4500-NO2B	2,4-D	EPA 8151A
BOD 5-day	SM 5210B	Dinoseb	EPA 8151A
Total Organic Carbon	SM 5310C	Pentachlorophenol	EPA 8151A
Aldrin	EPA 8081	Silvex	EPA 8151A
Alpha BHC	EPA 8081	Pyruvic	
Beta BHC	EPA 8081	Lactic	
Chlordane	EPA 8081	Formic	
DDD	EPA 8081	Acetic	
DDE	EPA 8081	Proprionic	
DDT	EPA 8081	Butyric	
Delta BHC	EPA 8081		
Dieldrin	EPA 8081		
Endosulfan I	EPA 8081		
Endosulfan II	EPA 8081		
Endosulfan Sulfate	EPA 8081		
Endrin	EPA 8081		

Note

This list of parameters was developed from the Monitoring, Sampling, and Analysis Report included in the permit amendment submitted in October 2001.

TABLE 4
LANDFILL GAS DATA
Project XL
Maplewood Recycling and Waste Disposal Facility
Amelia County, Virginia

LFG Well 1 (Test Area)

Parameter	12-Sep-02	17-Oct-02	21-Nov-02	19-Dec-02
Temperature (degrees F)	95	82	96	91
Flow Rate (scfm)	19	37	107	80
Methane (%)	53	56.1	63.3	51.3
Carbon Dioxide (%)	39.6	40.3	36.1	38.8
Oxygen (%)	0.6	0.2	0.5	0.1
Balance (%)	6.8	3.4	0	9.8

LFG Well 2 (Test Area)

Parameter	12-Sep-02	17-Oct-02	21-Nov-02	19-Dec-02
Temperature (degrees F)	98	87	96	88
Flow Rate (scfm)	47	75	62	109
Methane (%)	54	59	58.6	59.8
Carbon Dioxide (%)	42.7	40.6	39	39.6
Oxygen (%)	0.9	0.4	0.8	0.4
Balance (%)	2.4	0	2	0.2

LFG Well 3 (Test Area)

Parameter	12-Sep-02	17-Oct-02	21-Nov-02	19-Dec-02
Temperature (degrees F)	115	102	105	100
Flow Rate (scfm)	2	20	53	75
Methane (%)	53	59.5	50.1	58.2
Carbon Dioxide (%)	38.6	40.1	36.1	39.8
Oxygen (%)	0.6	0.4	0.2	0.6
Balance (%)	7.8	0	14	1.4

LFG Well 4 (Test Area)

Parameter	12-Sep-02	17-Oct-02	21-Nov-02	19-Dec-02
Temperature (degrees F)	98	63	124	100
Flow Rate (scfm)	22	36	56	59
Methane (%)	54	58	50.9	57.3
Carbon Dioxide (%)	40	40.2	33.7	39.9
Oxygen (%)	0.4	0.8	1.5	0.6
Balance (%)	5.6	1	14	2.2

TABLE 4
LANDFILL GAS DATA
(continued)

LFG Well 5 (Test Area)

Parameter	12-Sep-02	17-Oct-02	21-Nov-02	19-Dec-02
Temperature (degrees F)	97	98	102	90
Flow Rate (scfm)	6	36	45	65
Methane (%)	52	59.8	50.4	60.2
Carbon Dioxide (%)	39.1	39.7	36.7	38.6
Oxygen (%)	1.9	0.5	0.4	1.1
Balance (%)	7	0	13	0.1

LFG Well 6 (Test Area)

Parameter	12-Sep-02	17-Oct-02	21-Nov-02	19-Dec-02
Temperature (degrees F)	100	111	120	101
Flow Rate (scfm)	0	12	59	56
Methane (%)	60	48.8	59.8	59.8
Carbon Dioxide (%)	39	32.8	38.3	38.8
Oxygen (%)	0.5	3.6	0.2	1.2
Balance (%)	0.5	14.8	2	0.2

LFG Well 7 (Test Area)

Parameter	12-Sep-02	17-Oct-02	21-Nov-02	19-Dec-02
Temperature (degrees F)	110	100	81	100
Flow Rate (scfm)	23	38	64	76
Methane (%)	53	61.8	62.8	65.2
Carbon Dioxide (%)	46.2	38.1	36.9	34.7
Oxygen (%)	0.8	0.1	0.2	0
Balance (%)	0	0	0	0.1

LFG Well 8 (Test Area)

Parameter	12-Sep-02	17-Oct-02	21-Nov-02	19-Dec-02
Temperature (degrees F)	115	67	78	90
Flow Rate (scfm)	33	18	51	39
Methane (%)	59	60.7	65.2	63.9
Carbon Dioxide (%)	39.9	38.8	33.5	35.9
Oxygen (%)	1.1	0.5	1.1	0.1
Balance (%)	0	0	0	0.1

TABLE 4
LANDFILL GAS DATA
(continued)

LFG Well 9 (Test Area)

Parameter	12-Sep-02	17-Oct-02	21-Nov-02	19-Dec-02
Temperature (degrees F)	110	66	80	110
Flow Rate (scfm)	31	45	10	66
Methane (%)	60	63.1	60.8	63.7
Carbon Dioxide (%)	39.6	36.5	38.6	35.9
Oxygen (%)	0.4	0.4	0.5	0.3
Balance (%)	0	0	0	0.1

LFG Well 10 (Test Area)

Parameter	12-Sep-02	17-Oct-02	21-Nov-02	19-Dec-02
Temperature (degrees F)	109	114	80	110
Flow Rate (scfm)	40	55	36	36
Methane (%)	50	49.9	60.8	56.9
Carbon Dioxide (%)	41	33.3	38.6	39.5
Oxygen (%)	1	3	0.5	1
Balance (%)	8	13.8	0	2.6

LFG Well 11 (Control Area)

Parameter	12-Sep-02	17-Oct-02	21-Nov-02	19-Dec-02
Temperature (degrees F)	119	98	101	100
Flow Rate (scfm)	25	48	56	77
Methane (%)	58	60.2	57.8	61.6
Carbon Dioxide (%)	41.7	39.3	40.3	37.6
Oxygen (%)	0.3	0.5	0.9	0.6
Balance (%)	0	0	1	0.2

LFG Well 12 (in control area, but near application trenches)

Parameter	12-Sep-02	17-Oct-02	21-Nov-02	19-Dec-02
Temperature (degrees F)	115	119	84	100
Flow Rate (scfm)	35	54	102	66
Methane (%)	61	60.4	62.1	61
Carbon Dioxide (%)	38.6	39.2	37.3	38.5
Oxygen (%)	0.4	0.4	0.4	0.3
Balance (%)	0	0	0	0.2

TABLE 4
LANDFILL GAS DATA
(continued)

LFG Well 13 (in control area, but near application trenches)

Parameter	12-Sep-02	17-Oct-02	1-Nov-02	19-Dec-02
Temperature (degrees F)	110	75	94	100
Flow Rate (scfm)	40	61	41	76
Methane (%)	60	61.3	62.3	60.4
Carbon Dioxide (%)	39.5	38.1	37.2	38.9
Oxygen (%)	0.5	0.6	0.4	0.5
Balance (%)	0	0	0	0.2

LFG Well 14 (Control Area)

Parameter	12-Sep-02	17-Oct-02	1-Nov-02	19-Dec-02
Temperature (degrees F)	109	71	107	90
Flow Rate (scfm)	19	36	60	62
Methane (%)	56	66.7	59.7	62.2
Carbon Dioxide (%)	41.9	33.1	39.3	36.7
Oxygen (%)	1	0.2	0.8	1
Balance (%)	1.1	0	0	0.1

LFG Well 15 (Control Area)

Parameter	12-Sep-02	17-Oct-02	1-Nov-02	19-Dec-02
Temperature (degrees F)	111	73	93	79
Flow Rate (scfm)	22	49	49	46
Methane (%)	54	56.7	56.7	51
Carbon Dioxide (%)	40.6	41.3	38.6	36.4
Oxygen (%)	0.6	0.4	1.9	1.7
Balance (%)	4.8	1.6	3	10.9

LFG Well 16 (Control Area)

Parameter	12-Sep-02	17-Oct-02	1-Nov-02	19-Dec-02
Temperature (degrees F)	90	94	61	110
Flow Rate (scfm)	0	12	65.4	52
Methane (%)	53	57.6	57.2	58
Carbon Dioxide (%)	40	40.5	41.3	41.2
Oxygen (%)	1.7	0.8	1.3	0.7
Balance (%)	5.3	1.1	0	0.1

TABLE 4
LANDFILL GAS DATA
(continued)

LFG Well 17 (Control Area)

Parameter	12-Sep-02	17-Oct-02	21-Nov-02	19-Dec-02
Temperature (degrees F)	90	83	90	96
Flow Rate (scfm)	30	48	51	69
Methane (%)	52	54.1	59	55.5
Carbon Dioxide (%)	39.4	39.2	39.6	37.1
Oxygen (%)	0.8	0.4	1.2	0.4
Balance (%)	7.8	6.3	0	7

LFG Well 18 (Control Area)

Parameter	12-Sep-02	17-Oct-02	21-Nov-02	19-Dec-02
Temperature (degrees F)	109	93	103	103
Flow Rate (scfm)	10	25	23	60
Methane (%)	58	63.1	64.4	67.5
Carbon Dioxide (%)	41.3	36.4	35.3	31.5
Oxygen (%)	0.7	0.5	0.2	0.8
Balance (%)	0	0	0	0.2

LFG Well 29 (Control Area)

Parameter	12-Sep-02	17-Oct-02	21-Nov-02	19-Dec-02
Temperature (degrees F)	105	85	103	110
Flow Rate (scfm)	43	6	25	56
Methane (%)	55	59.3	64.4	50.5
Carbon Dioxide (%)	36.9	39.5	35.3	34.1
Oxygen (%)	2.1	1.2	0.2	4.5
Balance (%)	6	0	0	10.9

LFG Well 30 (Control Area)

Parameter	12-Sep-02	17-Oct-02	21-Nov-02	19-Dec-02
Temperature (degrees F)	105	69	96	100
Flow Rate (scfm)	5	62	55	64
Methane (%)	60	53.7	64.3	46.7
Carbon Dioxide (%)	39.5	35.3	35.2	35.9
Oxygen (%)	0.5	0.5	0.3	0.3
Balance (%)	0	10.5	0	17.1

TABLE 4
LANDFILL GAS DATA
(continued)

LFG Well 31 (Control Area)

Parameter	12-Sep-02	17-Oct-02	21-Nov-02	19-Dec-02
Temperature (degrees F)	100	89	111	100
Flow Rate (scfm)	30	65	39	64
Methane (%)	55	41.6	64.8	46.9
Carbon Dioxide (%)	42.3	33.4	34.4	34.7
Oxygen (%)	0.9	0.5	0.6	0.2
Balance (%)	1.8	24.5	0	18.2

LFG Well 37 (Control Area)

Parameter	12-Sep-02	17-Oct-02	21-Nov-02	19-Dec-02
Temperature (degrees F)	101	93	111	103
Flow Rate (scfm)	58	73	53	120
Methane (%)	60	66.9	64.8	59.6
Carbon Dioxide (%)	39	32.5	34.4	38.5
Oxygen (%)	1	0.6	0.6	0.7
Balance (%)	0	0	0	1.2

LFG Well 38 (Control Area)

Parameter	12-Sep-02	17-Oct-02	21-Nov-02	19-Dec-02
Temperature (degrees F)	110	93	85	102
Flow Rate (scfm)	49	50	54	84
Methane (%)	55	58.3	62.9	53.1
Carbon Dioxide (%)	35.8	39.1	36.3	35.7
Oxygen (%)	2.1	0.8	0.7	0.3
Balance (%)	7.1	1.8	0	10.9

LFG Well 39 (Control Area)

Parameter	12-Sep-02	17-Oct-02	21-Nov-02	19-Dec-02
Temperature (degrees F)	101	102	86	96
Flow Rate (scfm)	88	52	36	66
Methane (%)	56	50	66	45.7
Carbon Dioxide (%)	40.5	32.8	32.9	34.5
Oxygen (%)	0.8	0.4	1	0.1
Balance (%)	2.7	16.8	0	19.7

TABLE 4
LANDFILL GAS DATA
(continued)

LFG Well 80 (Test Area)

Parameter	12-Sep-02	17-Oct-02	21-Nov-02	19-Dec-02
Temperature (degrees F)	88	123	115	98
Flow Rate (scfm)	48	44	25	77
Methane (%)	48	53.2	68.3	55.4
Carbon Dioxide (%)	36.8	36.6	30.7	40.2
Oxygen (%)	0.2	0.4	0.8	0.4
Balance (%)	15	9.9	0	4

LFG Well 81 (Control Area)

Parameter	12-Sep-02	17-Oct-02	21-Nov-02	19-Dec-02
Temperature (degrees F)	112	65	90	94
Flow Rate (scfm)	52	45	42	86
Methane (%)	44	55	54.7	59.8
Carbon Dioxide (%)	36.2	40.9	37.2	39.6
Oxygen (%)	0.8	0.4	0.7	0.5
Balance (%)	19	3.7	7	0.1

LFG Well 82 (Control Area)

Parameter	12-Sep-02	17-Oct-02	21-Nov-02	19-Dec-02
Temperature (degrees F)	98	68	101	95
Flow Rate (scfm)	29	55	64	72
Methane (%)	55	59.1	62.2	47.9
Carbon Dioxide (%)	42.1	40.4	36.8	32.8
Oxygen (%)	0.6	0.5	0.8	2
Balance (%)	2.3	0	0	17.3

TABLE 5
EXAMPLE OF LEACHATE QUALITY DATA
Project XL
Maplewood Recycling and Waste Disposal Facility
Amelia County, Virginia

Test Area (Phase 1-2N)

Key Parameters	Units	12-Aug-02	13-Sep-02	30-Oct-02	20-Nov-02
Biological Oxygen Demand	mg/l	34	25	36	15
Chemical Oxygen Demand	mg/l	505	780	598	1,150
Total Organic Carbon	mg/l	155	152	160	164
BOD/COD Ratio	-	0.07	0.03	0.06	0.01
COD/TOC Ratio	-	3.26	5.13	3.74	7.01
Chloride	mg/l	886	938	984	930
Sulfate	mg/l	<10	<10	<10	<10
Nitrate Nitrogen	mg/l as N	0.05	0.05	0.12	1.37
Ammonia Nitrogen	mg/l as N	293	352	284	352

Secondary Parameters	Units	12-Aug-02	13-Sep-02	30-Oct-02	20-Nov-02
Arsenic	ug/L	20	20	< 10	20
Barium	ug/L	770	1070	110	890
Cadmium	ug/L	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	ug/L	20	30	< 10	30
Lead	ug/L	< 5	< 5	< 5	< 5
Mercury	ug/L	< 0.2	< 0.2	< 0.2	< 0.4
Nitrite Nitrogen	mg/L	< 0.05	< 0.05	< 0.05	0.16
Total Kjeldahl Nitrogen	mg/L	312	445	252	399
Ortho Phosphorus	mg/L	6.6	1.6	2.2	0.9
Potassium	ug/L	214000	215000	227000	251000
Selenium	ug/L	< 5	< 5	< 5	< 5
Silver	ug/L	< 10	< 10	< 10	< 10
Total Dissolved Solids	mg/L	3490	3440	3480	3670
Total Phosphorus	mg/L	1.9	2.1	3.1	0.7

TABLE 5
EXAMPLE OF LEACHATE QUALITY DATA
(continued)

Test Area (1-2S)

Parameter		12-Aug-02	13-Sep-02	30-Oct-02	20-Nov-02
Biological Oxygen Demand	mg/l	51	33	17	9
Chemical Oxygen Demand	mg/l	776	897	1,020	526
Total Organic Carbon	mg/l	211	203	181	147
BOD/COD Ratio	-	0.07	0.04	0.02	0.02
COD/TOC Ratio	-	3.68	4.42	5.64	3.58
Chloride	mg/l	465	1,210	1,160	832
Sulfate	mg/l	<10	<10	<10	<10
Nitrate Nitrogen	mg/l as N	0.09	0.11	0.05	0.05
Ammonia Nitrogen	mg/l as N	319	380	327	295

Secondary Parameters	Units	12-Aug-02	13-Sep-02	30-Oct-02	20-Nov-02
Arsenic	ug/L	10	< 10	10	< 10
Barium	ug/L	830	990	970	640
Cadmium	ug/L	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	ug/L	20	20	30	20
Lead	ug/L	< 5	< 5	< 5	< 5
Mercury	ug/L	< 0.2	< 0.2	< 0.2	< 0.4
Nitrite Nitrogen	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
Total Kjeldahl Nitrogen	mg/L	354	597	227	319
Ortho Phosphorus	mg/L	2.5	2	2.9	1.2
Potassium	ug/L	235000	239000	257000	211000
Selenium	ug/L	< 5	< 5	< 5	< 5
Silver	ug/L	< 10	< 10	< 10	< 10
Total Dissolved Solids	mg/L	3240	3320	10800	2580
Total Phosphorus	mg/L	2.6	2.7	2.5	0.6

TABLE 5
EXAMPLE OF LEACHATE QUALITY DATA
(continued)

Control Area (Phase 3)

Parameter	Units	12-Aug-02	13-Sep-02	30-Oct-02	20-Nov-02
Biological Oxygen Demand	mg/l	148	118	159	12
Chemical Oxygen Demand	mg/l	7,830	2,950	2,950	2,910
Total Organic Carbon	mg/l	873	812	763	814
BOD/COD Ratio	-	0.02	0.04	0.05	0.00
COD/TOC Ratio	-	8.97	3.63	3.87	3.57
Chloride	mg/l	2,180	2,990	2,990	2,930
Sulfate	mg/l	<10	<10	<10	<10
Nitrate Nitrogen	mg/l as N	0.08	0.08	0.16	0.19
Ammonia Nitrogen	mg/l as N	1,480	1,620	1,110	2,130

Secondary Parameters	Units	12-Aug-02	13-Sep-02	30-Oct-02	20-Nov-02
Arsenic	ug/L	30	30	40	30
Barium	ug/L	680	660	580	650
Cadmium	ug/L	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	ug/L	140	150	180	160
Lead	ug/L	< 5	< 5	< 5	< 5
Mercury	ug/L	< 0.2	< 0.2	< 0.2	< 0.4
Nitrite Nitrogen	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
Total Kjeldahl Nitrogen	mg/L	932	809	1693	1666
Ortho Phosphorus	mg/L	0.4	0.8	13	5.5
Potassium	ug/L	984000	900000	946000	1060000
Selenium	ug/L	5	< 5	8	6
Silver	ug/L	< 10	< 10	< 10	< 10
Total Dissolved Solids	mg/L	8280	7250	7620	7600
Total Phosphorus	mg/L	13.3	11.5	14.6	7.3

TABLE 5
EXAMPLE OF LEACHATE QUALITY DATA
(continued)

Control Area (Phase 4)

Parameter		12-Aug-02	13-Sep-02	30-Oct-02	20-Nov-02
Biological Oxygen Demand	mg/l	3,150	495	1650	24
Chemical Oxygen Demand	mg/l	8,230	4,980	4,680	6,880
Total Organic Carbon	mg/l	2,150	1,420	1,560	1,790
BOD/COD Ratio	-	0.38	0.10	0.35	0.00
COD/TOC Ratio	-	3.83	3.51	3.00	3.84
Chloride	mg/l	3,290	4,280	3,520	2,890
Sulfate	mg/l	<10	<10	<10	<10
Nitrate Nitrogen	mg/l as N	0.1	0.11	0.23	0.16
Ammonia Nitrogen	mg/l as N	1,750	2,630	1,120	2,040

Secondary Parameters	Units	12-Aug-02	13-Sep-02	30-Oct-02	20-Nov-02
Arsenic	ug/L	80	70	70	50
Barium	ug/L	490	450	370	410
Cadmium	ug/L	< 0.5	2.1	< 0.5	< 0.5
Chromium	ug/L	270	260	220	200
Lead	ug/L	< 5	5	< 5	< 5
Mercury	ug/L	< 0.2	< 0.2	< 0.2	< 0.4
Nitrite Nitrogen	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
Total Kjeldahl Nitrogen	mg/L	481	2417	1579	1830
Ortho Phosphorus	mg/L	0.5	0.5	9.5	6.3
Potassium	ug/L	714000	604000	487000	479000
Selenium	ug/L	7	8	6	< 5
Silver	ug/L	< 10	< 10	< 10	< 10
Total Dissolved Solids	mg/L	7530	9430	6030	5300
Total Phosphorus	mg/L	21.3	18.9	12.2	7.9

TABLE 5
EXAMPLE OF LEACHATE QUALITY DATA
(continued)

Leachate Tank

Parameter	Units	12-Aug-02	13-Sep-02	30-Oct-02	20-Nov-02
Biological Oxygen Demand	mg/l	52	143	1,310	120
Chemical Oxygen Demand	mg/l	2,490	2,630	2,150	2,340
Total Organic Carbon	mg/l	603	746	708	710
BOD/COD Ratio	-	0.02	0.05	0.61	0.05
COD/TOC Ratio	-	4.13	3.53	3.04	3.30
Chloride	mg/l	2,310	1,380	2,820	54
Sulfate	mg/l	<10	<10	<10	<10
Nitrate Nitrogen	mg/l as N	0.05	0.09	0.16	0.11
Ammonia Nitrogen	mg/l as N	1,510	1,590	1,390	1,560

Secondary Parameters	Units	12-Aug-02	13-Sep-02	30-Oct-02	20-Nov-02
Arsenic	ug/L	40	40	40	30
Barium	ug/L	640	660	600	680
Cadmium	ug/L	< 0.5	0.9	< 0.5	< 0.5
Chromium	ug/L	150	150	170	120
Lead	ug/L	< 5	< 5	< 5	< 5
Mercury	ug/L	< 0.2	< 0.2	< 0.2	< 0.4
Nitrite Nitrogen	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
Total Kjeldahl Nitrogen	mg/L	1373	1476	2919	1647
Ortho Phosphorus	mg/L	15.9	0.8	20	5
Potassium	ug/L	535000	568000	535000	455000
Selenium	ug/L	< 5	6	6	< 5
Silver	ug/L	< 10	< 10	< 10	< 10
Total Dissolved Solids	mg/L	6370	5960	5900	5490
Total Phosphorus	mg/L	18.8	8.3	11.9	8.3

TABLE 6
SUMMARY OF LEACHATE QUANTITY DATA
Project XL
Maplewood Recycling and Waste Disposal Facility
Amelia County, Virginia
2002

	Phase	Area (Acres)			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual Total
Test Area	PH 1 & 2 NOR	12.5	PRIMARY	GAL	6,602	6,020	8,699	4,353	6,378	6,557	15,895	9,197	7,269	5,616	5,776	6,900	89,262
			SECONDARY	GAL	0	7	48	35	99	2	103	0	0	0	800	247	1,341
	PH 1 & 2 SOU	13.9	PRIMARY	GAL	6,268	6,122	10,433	9,806	8,706	6,050	5,667	6,448	5,168	7,497	9,608	11,073	92,846
			SECONDARY	GAL	0	0	830	614	226	497	20	853	0	268	0	414	3,722
Control Area	PHASE 3	10.5	PRIMARY	GAL	45,672	40,965	40,811	40,111	43,156	38,889	39,249	44,639	39,007	40,324	35,410	31,133	479,366
			SECONDARY	GAL	1,481	29	0	1	1	1	1,477	0	0	0	0	23	3,013
	PHASE 4	11.1	PRIMARY	GAL	66,608	58,153	59,725	65,014	57,183	52,606	54,192	26,630	49,656	56,191	53,529	59,211	658,698
			SECONDARY	GAL	0	0	4,928	0	5,005	1	0	6	0	4,970	0	0	14,910
Current Disposal Area	PHASE 11	10.3	PRIMARY	GAL	38,454	35,476	34,927	37,692	35,345	29,802	33,545	29,377	29,552	30,663	6,989	27,395	369,217
			SECONDARY	GAL	27	2	0	0	0	2,901	1	1	5	2,811	0	0	5,748
	PHASE 12	9.5	PRIMARY	GAL	33,029	32,091	38,396	36,128	23,929	21,136	10,925	17,031	31,174	21,403	28,763	27,693	321,698
			SECONDARY	GAL	2,060	0	0	0	1	0	0	20	0	0	3,115	0	5,196
	Monthly Total				200,201	178,865	198,797	193,754	180,029	158,442	161,074	134,202	161,831	169,743	143,990	164,089	2,045,017

Note:

This table is based on site records for the Maplewood Recycling and Waste Disposal Facility showing the amount of leachate collected in the primary and seconday leachate collection system. These records were provided by Waste Management and the site manager (Brian McClung) in a series faxes between September 2002 and December 2002.

The test area is represented by Ph 1&2 Nor and Ph 1&2 Sou, the control area is represented by Phase 3 and Phase 4, Phase 11 and Phase 12 are the current disposal areas and are provided for information purposes only.

TABLE 7
LIQUID APPLICATION SUMMARY
Project XL
Maplewood Recycling and Waste Disposal Facility
Amelia County, Virginia

	Liquid Applied (gallons)				Monthly Summary			
Date	Trench 1	Trench 2	Trench 3	Cumulative Total	Trench 1	Trench 2	Trench 3	Monthly Total
8/20/2002	13,441	7,203	0	20,644				
8/21/2002	0	0	0	20,644				
8/22/2002	6,695	6,662	6,669	40,670				
8/23/2002	0	0	0	40,670				
8/24/2002	0	0	0	40,670				
8/25/2002	13,281	13,210	13,369	80,530				
8/26/2002	0	0	0	80,530				
8/27/2002	0	0	0	80,530				
8/28/2002	0	0	0	80,530				
8/29/2002	0	0	0	80,530				
8/30/2002	0	0	0	80,530				
8/31/2002	0	0	0	80,530	33,417	27,075	20,038	80,530
9/1/2002	0	0	0	80,530				
9/2/2002	0	0	0	80,530				
9/3/2002	0	6,500	0	87,030				
9/4/2002	0	0	0	87,030				
9/5/2002	6,600	6,524	6,570	106,724				
9/6/2002	0	0	0	106,724				
9/7/2002	0	0	0	106,724				
9/8/2002	0	0	0	106,724				
9/9/2002	6,722	13,456	13,439	140,341				
9/10/2002	0	0	0	140,341				
9/11/2002	13,396	13,420	13,405	180,562				
9/12/2002	13,408	13,405	13,470	220,845				
9/13/2002	0	0	0	220,845				
9/14/2002	0	0	0	220,845				
9/15/2002	0	0	0	220,845				
9/16/2002	0	13,415	13,482	247,742				
9/17/2002	0	0	0	247,742				
9/18/2002	13,422	13,446	13,492	288,102				
9/19/2002	0	0	0	288,102				
9/20/2002	0	0	0	288,102				
9/21/2002	0	0	0	288,102				
9/22/2002	0	0	0	288,102				
9/23/2002	13,544	13,468	13,506	328,620				
9/25/2002	13,523	13,470	13,511	369,124				
9/26/2002	0	0	0	369,124				
9/27/2002	0	0	0	369,124				
9/28/2002	0	0	0	369,124				
9/29/2002	0	0	0	369,124				
9/30/2002	13,468	13,506	13,470	409,568	94,083	120,610	114,345	329,038

TABLE 7 (continued)
LIQUID APPLICATION SUMMARY
Project XL
Maplewood Recycling and Waste Disposal Facility
Amelia County, Virginia

	Liquid Applied (gallons)				Monthly Summary			
Date	Trench 1	Trench 2	Trench 3	Cumulative Total	Trench 1	Trench 2	Trench 3	Monthly Total
10/1/2002	6,700	6,698	6,733	429,699				
10/2/2002	6,726	6,707	0	443,132				
10/3/2002	0	0	0	443,132				
10/4/2002	0	0	0	443,132				
10/5/2002	0	0	0	443,132				
10/6/2002	0	0	0	443,132				
10/7/2002	6,743	6,699	6,700	463,274				
10/8/2002	6,690	6,664	6,757	483,385				
10/9/2002	0	0	0	483,385				
10/10/2002	13,454	6,683	6,709	510,231				
10/11/2002	0	0	0	510,231				
10/12/2002	0	0	0	510,231				
10/13/2002	0	0	0	510,231				
10/14/2002	0	0	0	510,231				
10/15/2002	6,757	6,683	13,459	537,130				
10/16/2002	0	0	0	537,130				
10/17/2002	13,455	6,762	13,464	570,811				
10/18/2002	0	0	0	570,811				
10/19/2002	0	0	0	570,811				
10/20/2002	0	0	0	570,811				
10/21/2002	13,637	6,792	13,521	604,761				
10/22/2002	0	0	0	604,761				
10/23/2002	0	0	0	604,761				
10/24/2002	13,502	0	13,388	631,651				
10/25/2002	0	0	0	631,651				
10/26/2002	0	0	0	631,651				
10/27/2002	0	0	0	631,651				
10/28/2002	13,234	6,610	13,281	664,776				
10/29/2002	0	0	0	664,776				
10/30/2002	0	0	0	664,776				
10/31/2002	0	0	0	664,776	100,898	60,298	94,012	255,208
11/1/2002	13338	0	13265	691,379				
11/2/2002	0	0	0	691,379				
11/3/2002	0	0	0	691,379				
11/4/2002	13364	6676	13321	724,740				
11/5/2002	0	0	0	724,740				
11/6/2002	0	0	0	724,740				
11/7/2002	13362	6645	13345	758,092				
11/8/2002	0	0	0	758,092				
11/9/2002	0	0	0	758,092				
11/10/2002	0	0	0	758,092				
11/11/2002	0	0	0	758,092				

TABLE 7 (continued)
LIQUID APPLICATION SUMMARY
Project XL
Maplewood Recycling and Waste Disposal Facility
Amelia County, Virginia

	Liquid Applied (gallons)				Monthly Summary			
Date	Trench 1	Trench 2	Trench 3	Cumulative Total	Trench 1	Trench 2	Trench 3	Monthly Total
11/12/2002	0	0	0	758,092				
11/13/2002	0	0	0	758,092				
11/14/2002	0	0	0	758,092				
11/15/2002	0	0	0	758,092				
11/16/2002	0	0	0	758,092				
11/17/2002	0	0	0	758,092				
11/18/2002	0	0	0	758,092				
11/19/2002	6664	0	6631	771,387				
11/20/2002	0	0	0	771,387				
11/21/2002	0	0	0	771,387				
11/22/2002	0	0	0	771,387				
11/23/2002	0	0	0	771,387				
11/24/2002	0	0	0	771,387				
11/25/2002	0	0	0	771,387				
11/26/2002	0	0	0	771,387				
11/27/2002	0	0	0	771,387				
11/28/2002	0	0	0	771,387				
11/29/2002	0	0	0	771,387				
11/30/2002	0	0	0	771,387	46,728	13,321	46,562	106,611
12/1/2002	0	0	0	771,387				
12/2/2002	0	0	0	771,387				
12/3/2002	0	0	0	771,387				
12/4/2002	6477	6520	6493	790,877				
12/5/2002	0	0	0	790,877				
12/6/2002	0	0	0	790,877				
12/7/2002	0	0	0	790,877				
12/8/2002	0	0	0	790,877				
12/9/2002	0	0	0	790,877				
12/10/2002	13200	13429	19940	837,446				
12/11/2002	0	0	0	837,446				
12/12/2002	6795	0	6572	850,813				
12/13/2002	0	0	0	850,813				
12/14/2002	0	0	0	850,813				
12/15/2002	0	0	0	850,813				
12/16/2002	0	0	0	850,813				
12/17/2002	0	0	0	850,813				
12/18/2002	0	0	0	850,813				
12/19/2002	0	0	0	850,813				
12/20/2002	0	0	0	850,813				
12/21/2002	0	0	0	850,813				
12/22/2002	0	0	0	850,813				
12/23/2002	0	0	0	850,813				

TABLE 7 (continued)
LIQUID APPLICATION SUMMARY
Project XL
Maplewood Recycling and Waste Disposal Facility
Amelia County, Virginia

	Liquid Applied (gallons)				Monthly Summary			
Date	Trench 1	Trench 2	Trench 3	Cumulative Total	Trench 1	Trench 2	Trench 3	Monthly Total
12/24/2002	0	0	0	850,813				
12/25/2002	0	0	0	850,813				
12/26/2002	13469	0	0	864,282				
12/27/2002	0	0	0	864,282				
12/28/2002	0	0	0	864,282				
12/29/2002	0	0	0	864,282				
12/30/2002	0	0	0	864,282				
12/31/2002	0	0	0	864,282	39,941	19,949	33,005	92,895
1/1/2003	0	0	0	864,282				

Total per trench	315,067	241,253	307,962	Total Leachate Recirculated	864,282
Daily Average	2,369	1,814	2,316	Total Daily Average	6,498

All units are in gallons

TABLE 8
SUMMARY OF LANDFILL SETTLEMENT DATA
Project XL
Maplewood Recycling and Waste Disposal Facility
Amelia County, Virginia

Point No.	Northing	Easting	Elev 8/2/2002	Elev 10/24/2002	Difference in grade 10/24/02 to 8/2/02
Control Area					
1004	3,635,349.73	11,610,244.17	485.87	485.39	-0.48
1005	3,635,448.00	11,610,262.56	485.51	485.04	-0.47
1006	3,635,546.31	11,610,280.96	488.10	487.72	-0.37
1007	3,635,644.56	11,610,299.35	489.08	488.77	-0.31
1008	3,635,742.79	11,610,317.74	489.29	489.21	-0.08
1018	3,635,662.70	11,610,201.04	486.24	486.08	-0.16
1019	3,635,564.34	11,610,182.66	484.57	484.27	-0.30
1020	3,635,466.17	11,610,164.24	483.05	482.72	-0.33
1021	3,635,367.83	11,610,145.87	482.26	481.94	-0.32
1022	3,635,269.54	11,610,127.55	480.97	480.59	-0.38
1023	3,635,171.30	11,610,109.13	477.72	477.37	-0.35
1024	3,635,189.69	11,610,010.81	472.04	471.74	-0.30
1025	3,635,091.34	11,609,992.34	468.72	468.35	-0.37
1026	3,635,288.00	11,610,029.13	474.30	474.05	-0.25
1027	3,635,386.32	11,610,047.53	475.71	475.20	-0.51
1028	3,635,484.54	11,610,066.03	477.62	477.36	-0.27
1029	3,635,582.91	11,610,084.37	479.07	478.85	-0.22
1030	3,635,681.10	11,610,102.80	480.72	480.53	-0.19
1041	3,635,699.44	11,610,004.53	472.92	472.85	-0.07
1042	3,635,601.14	11,609,986.14	472.03	471.81	-0.22
1043	3,635,502.84	11,609,967.77	471.02	470.75	-0.27
1044	3,635,404.59	11,609,949.32	470.05	469.80	-0.25
1045	3,635,306.31	11,609,930.87	468.07	467.72	-0.35
1046	3,635,208.01	11,609,912.58	465.01	464.78	-0.23
1047	3,635,109.73	11,609,894.15	461.57	461.29	-0.27
1048	3,635,011.39	11,609,875.70	452.50	452.28	-0.22
1049	3,635,029.78	11,609,777.38	452.53	452.46	-0.08
1050	3,635,128.05	11,609,795.71	454.78	454.55	-0.23
1051	3,635,226.37	11,609,814.18	457.93	457.68	-0.25
1052	3,635,324.67	11,609,832.49	460.81	460.65	-0.17
1053	3,635,422.98	11,609,850.93	463.32	462.89	-0.43
1054	3,635,521.22	11,609,869.39	465.71	465.18	-0.53
1055	3,635,619.61	11,609,887.68	466.06	465.78	-0.28
1056	3,635,717.83	11,609,906.15	466.95	466.84	-0.11
1067	3,635,736.32	11,609,807.82	463.21	463.04	-0.17
1068	3,635,638.08	11,609,789.37	461.01	460.97	-0.04
1069	3,635,539.79	11,609,770.95	460.16	460.00	-0.15
1070	3,635,441.45	11,609,752.58	457.70	457.48	-0.22
1071	3,635,343.15	11,609,734.20	455.12	455.02	-0.10
1072	3,635,244.85	11,609,715.82	451.48	451.32	-0.15
1073	3,635,146.56	11,609,697.41	448.58	448.38	-0.20
1074	3,635,048.25	11,609,679.00	448.55	448.41	-0.14

TABLE 8 (continued)
SUMMARY OF LANDFILL SETTLEMENT DATA
Project XL
Maplewood Recycling and Waste Disposal Facility
Amelia County, Virginia

Point No.	Northing	Easting	Elev 8/2/2002	Elev 10/24/2002	Difference in grade 10/24/02 to 8/2/02
1075	3,635,066.63	11,609,580.65	439.54	439.45	-0.08
1076	3,635,164.92	11,609,599.02	440.47	440.40	-0.07
1077	3,635,263.23	11,609,617.48	445.99	445.91	-0.08
1078	3,635,361.52	11,609,635.86	448.91	448.78	-0.14
1079	3,635,459.84	11,609,654.19	451.72	451.54	-0.18
1080	3,635,558.09	11,609,672.62	452.56	452.25	-0.31
1081	3,635,656.40	11,609,691.02	455.31	455.09	-0.22
1094	3,635,674.74	11,609,592.74	450.59	450.51	-0.08
1095	3,635,576.47	11,609,574.29	447.01	446.77	-0.24
1096	3,635,478.15	11,609,555.97	445.83	445.63	-0.20
1097	3,635,379.86	11,609,537.48	444.65	444.56	-0.09
1098	3,635,281.56	11,609,519.19	440.66	440.57	-0.10
1099	3,635,183.28	11,609,500.81	437.68	437.37	-0.32
1100	3,635,084.97	11,609,482.37	435.45	435.41	-0.03
1101	3,635,092.33	11,609,443.10	434.95	434.92	-0.03
1103	3,635,201.68	11,609,402.49	434.51	434.30	-0.20
1104	3,635,299.97	11,609,420.80	435.96	435.88	-0.08
1105	3,635,398.26	11,609,439.26	438.83	438.82	0.00
1106	3,635,496.53	11,609,457.76	439.74	439.74	0.00
1107	3,635,594.83	11,609,476.11	440.55	440.34	-0.22
1108	3,635,693.11	11,609,494.53	444.53	444.34	-0.19
1121	3,635,711.48	11,609,396.28	443.54	443.45	-0.08
1122	3,635,613.24	11,609,377.78	439.75	439.61	-0.14
1123	3,635,514.93	11,609,359.43	436.73	436.49	-0.24
1124	3,635,416.63	11,609,341.06	435.79	435.75	-0.05
1125	3,635,629.81	11,609,289.23	437.70	437.58	-0.12
1126	3,635,729.92	11,609,297.95	441.94	441.94	0.00
Test Area					
1009	3,635,841.19	11,610,336.14	489.94	489.75	-0.19
1010	3,635,939.49	11,610,354.55	489.88	489.60	-0.28
1011	3,636,037.73	11,610,372.92	490.38	490.18	-0.20
1012	3,636,135.89	11,610,391.31	490.32	490.16	-0.16
1013	3,636,154.20	11,610,293.02	486.99	486.87	-0.12
1014	3,636,056.01	11,610,274.63	487.20	487.11	-0.09
1015	3,635,957.68	11,610,256.23	486.71	486.52	-0.19
1016	3,635,859.38	11,610,237.82	485.21	484.90	-0.31
1017	3,635,761.00	11,610,219.44	486.48	486.20	-0.28
1031	3,635,779.51	11,610,121.17	481.41	481.18	-0.22
1032	3,635,877.83	11,610,139.57	481.09	480.95	-0.14
1033	3,635,976.12	11,610,157.96	482.03	482.03	0.00
1034	3,636,074.38	11,610,176.37	482.34	482.28	-0.06
1035	3,636,172.64	11,610,194.76	477.76	477.64	-0.12
1036	3,636,190.94	11,610,096.48	473.03	472.87	-0.16

TABLE 8 (continued)
SUMMARY OF LANDFILL SETTLEMENT DATA
Project XL
Maplewood Recycling and Waste Disposal Facility
Amelia County, Virginia

Point No.	Northing	Easting	Elev 8/2/2002	Elev 10/24/2002	Difference in grade 10/24/02 to 8/2/02
1037	3,636,092.58	11,610,078.09	476.70	476.52	-0.17
1038	3,635,994.28	11,610,059.72	475.69	475.55	-0.14
1039	3,635,896.02	11,610,041.31	476.49	476.49	0.00
1040	3,635,797.72	11,610,022.91	475.24	475.24	0.01
1057	3,635,816.15	11,609,924.54	468.79	468.65	-0.14
1058	3,635,914.40	11,609,942.95	470.40	470.33	-0.07
1059	3,636,012.73	11,609,961.33	471.67	471.67	0.00
1060	3,636,111.00	11,609,979.74	473.09	473.02	-0.07
1061	3,636,209.35	11,609,998.10	469.98	469.84	-0.14
1062	3,636,227.79	11,609,899.79	466.12	466.11	-0.01
1063	3,636,129.59	11,609,881.36	468.41	468.33	-0.07
1064	3,636,031.25	11,609,862.99	469.26	469.21	-0.05
1065	3,635,932.97	11,609,844.58	466.66	466.63	-0.03
1066	3,635,834.57	11,609,826.23	463.00	463.00	0.00
1082	3,635,754.73	11,609,709.37	458.29	458.25	-0.03
1083	3,635,853.02	11,609,727.79	459.15	459.05	-0.10
1084	3,635,951.27	11,609,746.21	463.12	463.12	0.00
1085	3,636,049.55	11,609,764.61	464.37	464.35	-0.02
1086	3,636,147.94	11,609,782.97	463.55	463.49	-0.06
1087	3,636,246.13	11,609,801.40	463.11	463.11	0.00
1088	3,636,264.49	11,609,703.13	462.28	462.28	0.00
1089	3,636,166.21	11,609,684.72	461.07	461.07	0.00
1090	3,636,067.97	11,609,666.29	460.16	460.16	0.00
1091	3,635,969.64	11,609,647.92	458.71	458.71	0.00
1092	3,635,871.35	11,609,629.52	455.39	455.32	-0.07
1093	3,635,773.00	11,609,611.20	453.10	453.01	-0.09
1109	3,635,791.40	11,609,512.91	447.00	446.88	-0.12
1110	3,635,889.74	11,609,531.28	449.69	449.63	-0.06
1111	3,635,988.07	11,609,549.63	452.44	452.44	0.00
1112	3,636,086.37	11,609,568.01	455.21	455.21	0.00
1113	3,636,184.68	11,609,586.40	455.94	455.94	0.00
1114	3,636,282.85	11,609,604.89	457.94	457.94	0.00
1115	3,636,301.28	11,609,506.56	452.17	452.17	0.00
1116	3,636,202.99	11,609,488.15	450.20	450.04	-0.16
1117	3,636,104.71	11,609,469.78	449.09	449.09	0.00
1118	3,636,006.39	11,609,451.41	448.42	448.42	0.00
1119	3,635,908.14	11,609,432.94	447.08	447.08	0.00
1120	3,635,809.87	11,609,414.54	442.72	442.72	0.00
1127	3,635,828.22	11,609,316.33	442.36	442.19	-0.16
1128	3,635,926.52	11,609,334.68	443.66	443.66	0.00
1129	3,636,024.81	11,609,353.11	446.31	446.29	-0.02
1130	3,636,123.13	11,609,371.52	446.79	446.79	0.00
1131	3,636,221.45	11,609,389.88	446.82	446.67	-0.15

TABLE 8 (continued)
SUMMARY OF LANDFILL SETTLEMENT DATA
Project XL
Maplewood Recycling and Waste Disposal Facility
Amelia County, Virginia

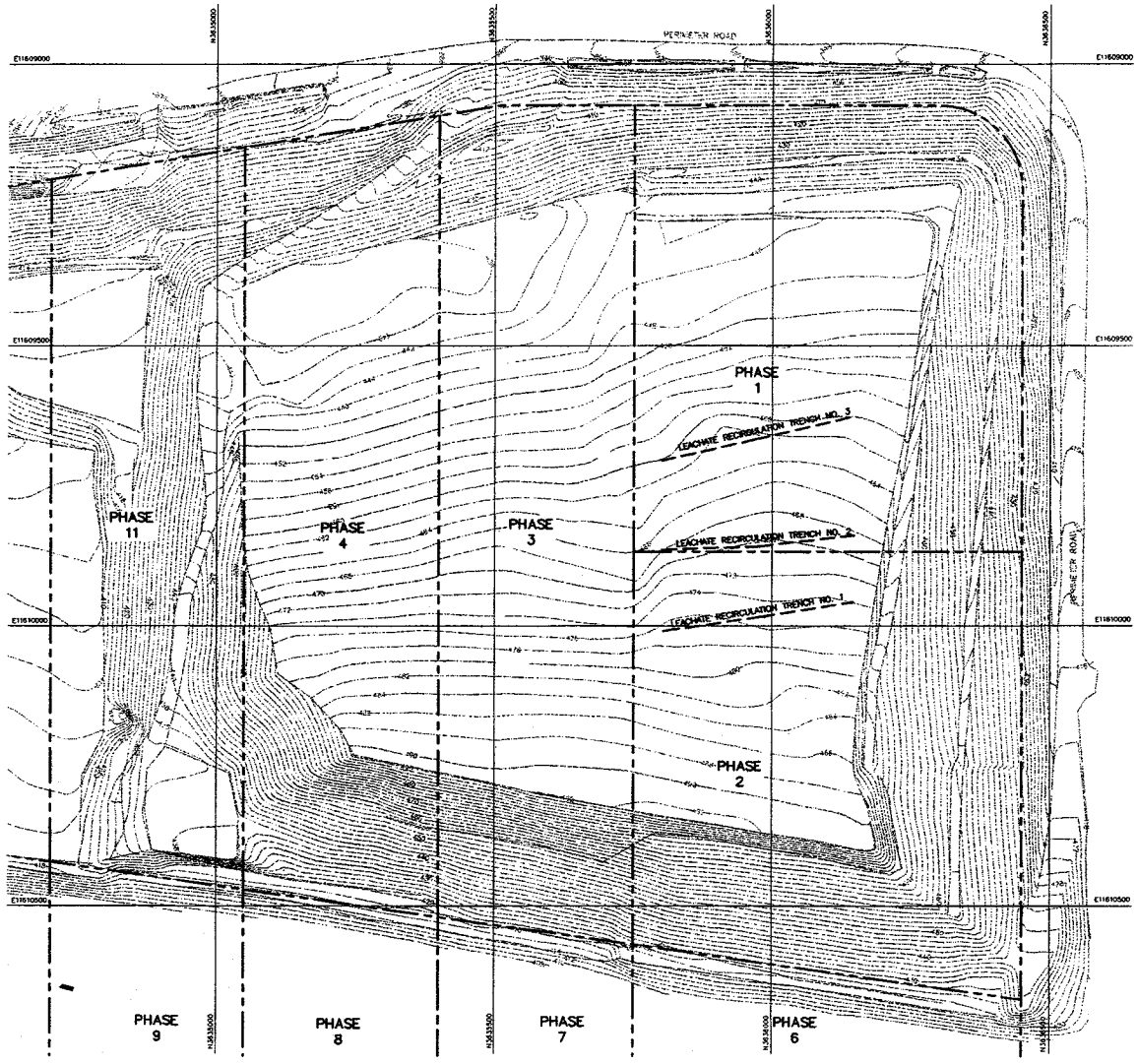
Point No.	Northing	Easting	Elev 8/2/2002	Elev 10/24/2002	Difference in grade 10/24/02 to 8/2/02
1132	3,636,319.64	11,609,408.34	446.62	446.62	0.00
1133	3,636,337.98	11,609,310.06	443.94	443.93	-0.01
1134	3,636,239.72	11,609,291.66	447.32	447.32	0.00
1135	3,636,141.46	11,609,273.23	447.30	447.30	0.00
1136	3,636,043.11	11,609,254.88	445.01	445.01	0.00

TABLE 9
SUMMARY OF WASTE CHARACTERIZATION DATA
Project XL
Maplewood Recycling and Waste Disposal Facility
Amelia County, Virginia

	Sample Date	Location	Depth (ft)	Moisture (%)	VS (%)	Cellulose (%)	Lignin (%)	Cell/Lig Ratio	pH (Field)	BMP (mL/g)
Control Area	8/7/2001	Control-1	0-10	31.57	46.36	28.13	22.1	1.27	5.5	73.03
					48.94	26.62	22.2	1.20		71.98
					45.40					69.86
	8/7/2001	Control-1	10-20	40.72	57.93	30.31	21.7	1.40	5.5	69.08
					50.16	27.86	21	1.33		76.15
					57.92					76.44
	8/7/2001	Control-1	20-30	33.16	55.12	38.72	15.50	2.50	5.8	71.56
					62.96	31.33	15.00	2.09		87.68
					35.33					85.19
	8/7/2001	Control-1	30-40	38.47	59.26	31.58	25.00	1.26	7.8	79.45
					52.16	29.16	28.90	1.01		82.94
					61.08					80.67
	8/7/2001	Control-2	0-10	34.72	50.13	27.79	16.60	1.67	5.8	70.58
					53.26	35.11	16.90	2.08		76.51
					47.55					77.80
	8/7/2001	Control-2	10-20	40.05	45.61	30.19	20.40	1.48	5.5	68.75
					46.31	36.68	18.10	2.03		75.78
					45.96					75.34
	8/7/2001	Control-2	20-30	41.83	47.98	30.42	19.10	1.59	6.7	78.75
					48.18	30.50	18.30	1.67		76.23
					48.64					78.51
	8/7/2001	Control-2	30-40	52.70	73.51	35.62	24.80	1.44	8.2	98.48
					75.16	36.63	25.70	1.43		101.18
					75.05					105.73
Test Area	5/11/2001	Bio 1	0-10	42.56	76.57	-	31.70	-	5.7	83.18
					75.24	29.50	28.70	1.03		117.79
					75.86					175.70
	5/11/2001	Bio 1	10-20	39.80	62.15	25.01	19.50	1.28	7.7	69.46
					85.41 *	22.56	19.30	1.17		106.17
					61.47					65.85
	5/11/2001	Bio 1	20-30	33.62	47.83	19.00	20.40	0.93	5.3	134.09
					53.86	23.00	20.40	1.13		84.04
					51.18					121.08
	5/11/2001	Bio 1	30-40	37.20	71.67	33.77	28.80	1.17	5.6	90.47
					76.08	25.30	27.10	0.93		118.13
					71.20					104.92
	5/10/2001	Bio 2	0-10	28.75	78.03	32.87	24.40	1.35	5.8	115.60
					76.90	36.58	23.90	1.53		93.32
					78.52					112.01
	5/10/2001	Bio 2	10-20	51.20	61.91	22.74	22.50	1.01	8.4	85.83
					67.41	23.07	22.10	1.04		134.03
					62.31					174.36
	5/10/2001	Bio 2	20-30	40.56	67.96	26.36	22.40	1.18	8.2	78.18
					68.32	27.10	24.60	1.10		86.14
					70.42					50.74
	5/10/2001	Bio 2	30-40	27.80	69.90	34.22	22.90	1.49	7.5	38.61
					71.24	29.04	25.00	1.16		43.11
					68.27					31.50
	5/10/2001	Bio 3	0-10	39.86	78.94	36.38	25.20	1.44	5.3	19.12
					49.19 *	32.61	27.60	1.18		18.72
					79.46					38.36
	5/10/2001	Bio 3	10-20	38.59	62.23	36.15	17.60	2.05	8.5	98.93
					60.58	37.58	16.10	2.33		51.21
					63.07					119.14
	5/10/2001	Bio 3	20-30	38.46	81.44	39.96	24.70	1.62	5.5	101.60
					78.17	39.48	23.70	1.67		95.59
					80.78					40.51
	5/10/2001	Bio 3	30-40	32.80	74.58	39.80	18.40	2.16	6.2	109.92
					75.85	41.00	18.70	2.19		104.25
					73.58					189.83

TABLE 10
2003 MONITORING ACTIVITIES
Project XL
Maplewood Recycling and Waste Disposal Facility
Amelia County, Virginia

	Monitoring Parameters	Responsible Party	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1. LEACHATE	Chemical parameters measured on site	WM personnel	X			X			X					
	Physical parameters measured on site	WM personnel	X	X	X	X	X	X	X	X	X	X	X	X
	Chemical parameters sampled on site from test area	Sampled by subcontractor, tested offsite by Geochemical	X			X			X					
	Chemical parameters sampled on site from storage tanks	Sampled by subcontractor, tested offsite by Geochemical	X			X			X					
2. LANDFILL GAS	Landfill gas composition measured on site	WM personnel	X	X	X	X	X	X	X	X	X	X	X	X
	Physical parameters measured on site	WM personnel	X	X	X	X	X	X	X	X	X	X	X	X
	Chemical parameters	WM personnel, testing by subcontractor	X			X			X					
	Surface landfill gas measured on site	Subcontractor	X			X			X					
3. SOLID WASTE	Survey, on site	Subcontractor	X		X		X		X		X		X	
	Solid waste stabilization and decomposition measured on site	WM personnel								X				



NORTH

LEGEND

- PHASE BOUNDARY
- EXISTING GRADE CONTOUR (FEET, MSL)
- LEACHATE RECIRCULATION TRENCH

NOTES:

1. TOPOGRAPHIC INFORMATION IS FROM AN ELECTRONIC FILE BY FLORA SURVEYING OF A SURVEY CONDUCTED ON 24 APRIL 2002.

100 50 0 100 200
SCALE: 1" = 100'

GeoSyntec Consultants
COLUMBIA, MARYLAND (410)381-4333

REV.	DATE	DESCRIPTION	DR BY	APP BY

DATE: SEPTEMBER 2002 | PROJECT NO. ME0275-01 | SCALE: 1" = 100'

DES BY	DTM	SEPT 02
DRN BY	JOC	SEPT 02
CHK BY	MFH	SEPT 02
REV BY		
APP BY		

PROJECT: XL PROJECT
MAPLEWOOD LANDFILL

SHEET TITLE: EXISTING CONDITIONS

SIGNATURE
DATE

WASTE MANAGEMENT, INC.

FILE NO: 0275-001
DRAWING NO: 1 OF 4

FIGURE 2
LIQUID APPLIED TO LANDFILL - CUMULATIVE
Project XL
Maplewood Recycling and Waste Disposal Facility
Amelia County, Virginia

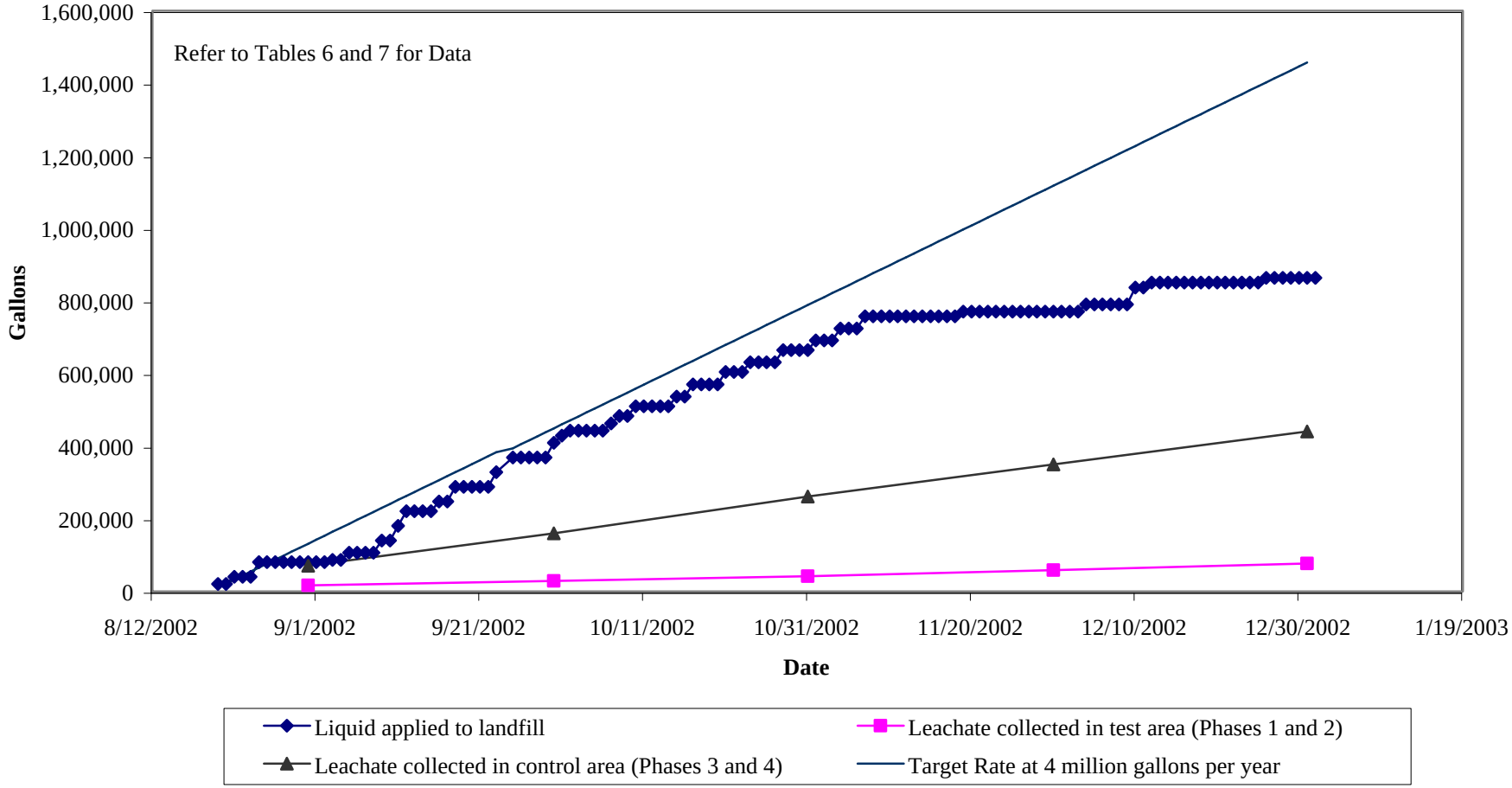


FIGURE 3
BOD/COD RATIO
Project XL
Maplewood Recycling and Waste Disposal Facility
Amelia County, Virginia

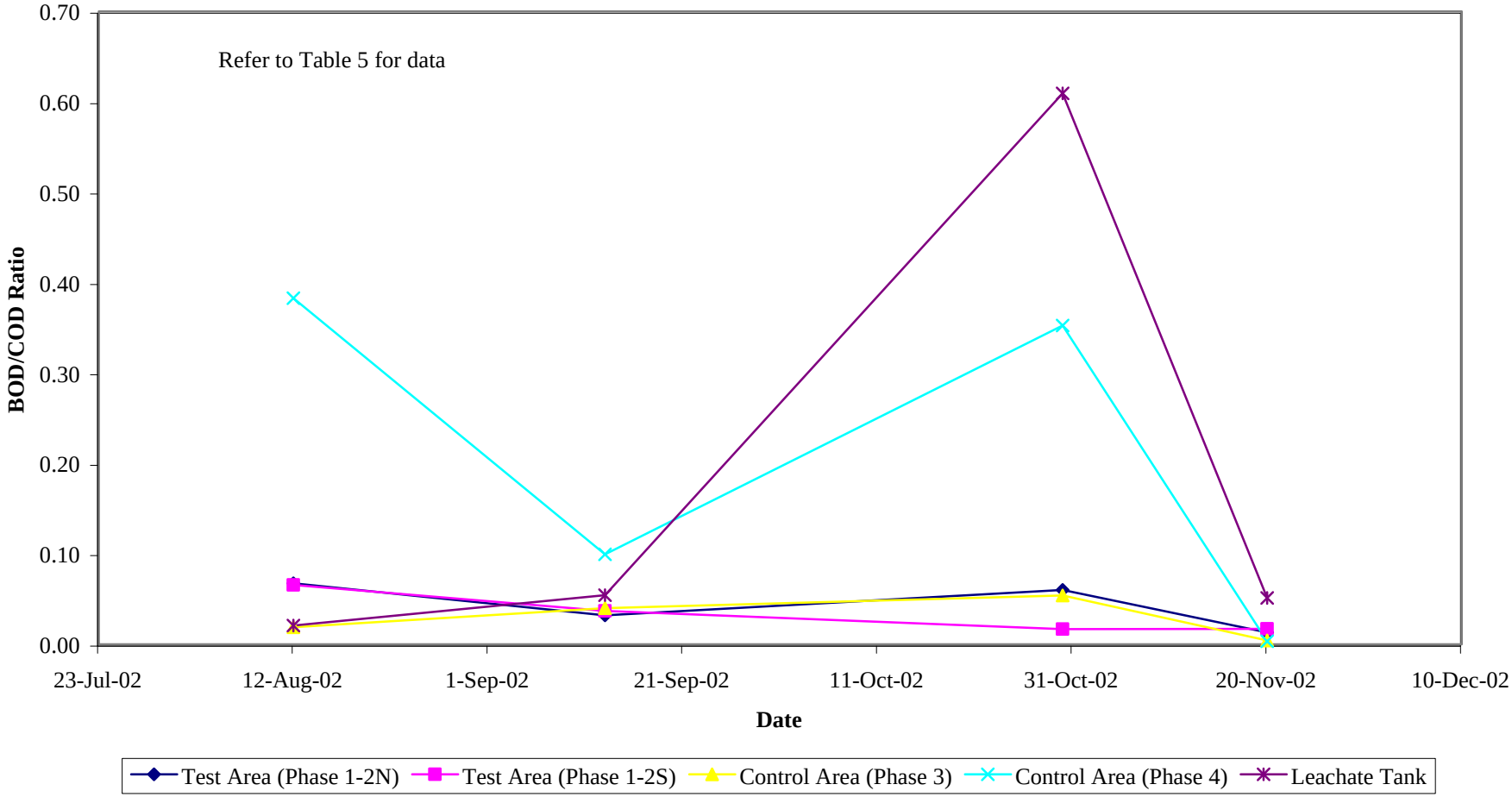


FIGURE 4
COD/TOC RATIO
Project XL
Maplewood Recycling and Waste Disposal Facility
Amelia County, Virginia

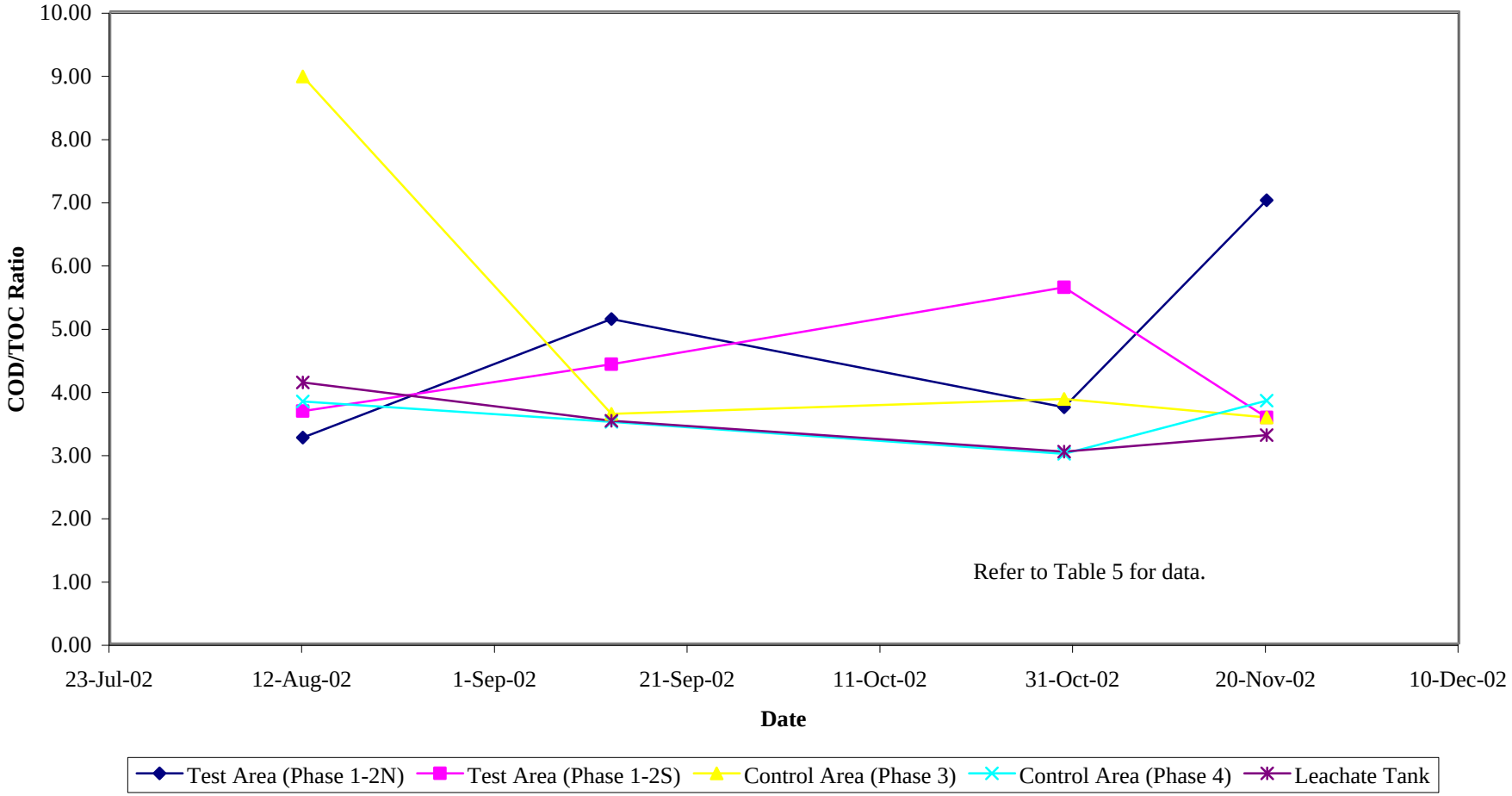


FIGURE 5
CHLORIDE CONCENTRATION
Project XL
Maplewood Recycling and Waste Disposal Facility
Amelia County, Virginia

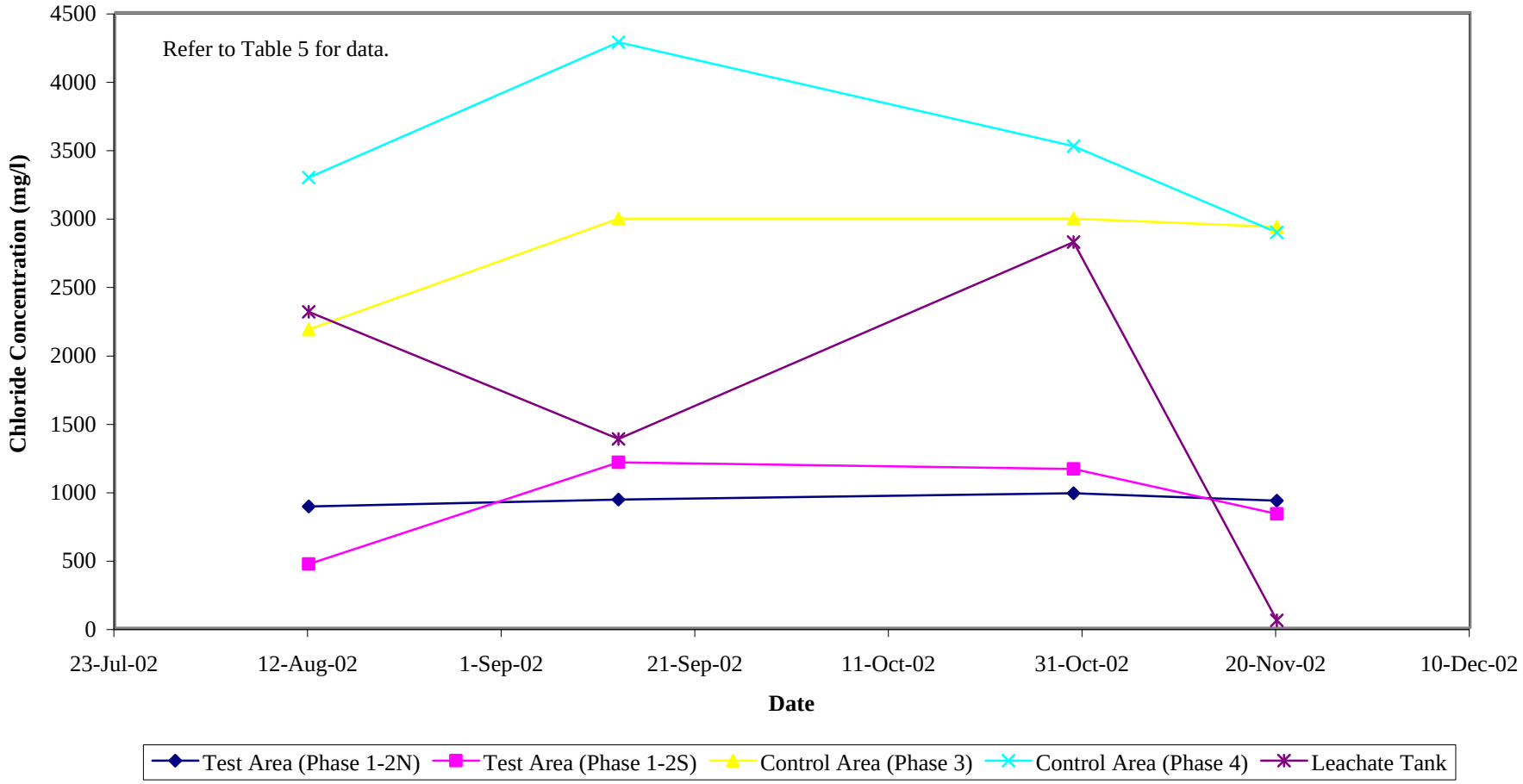


FIGURE 6
NITRATE NITROGEN CONCENTRATION
Project XL
Maplewood Recycling and Waste Disposal Facility
Amelia County, Virginia

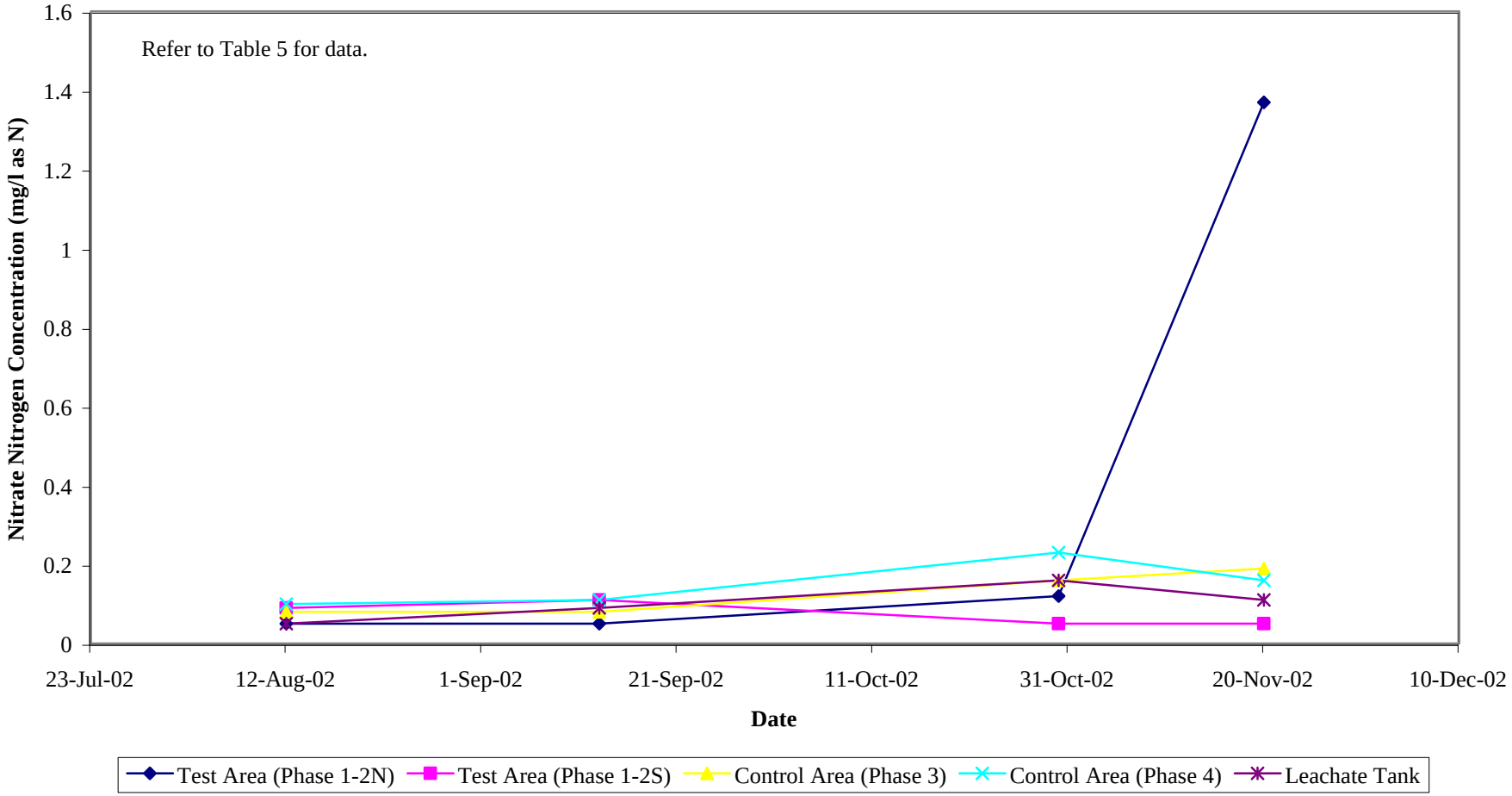


FIGURE 7
AMMONIA NITROGEN CONCENTRATION
Project XL
Maplewood Recycling and Waste Disposal Facility
Amelia County, Virginia

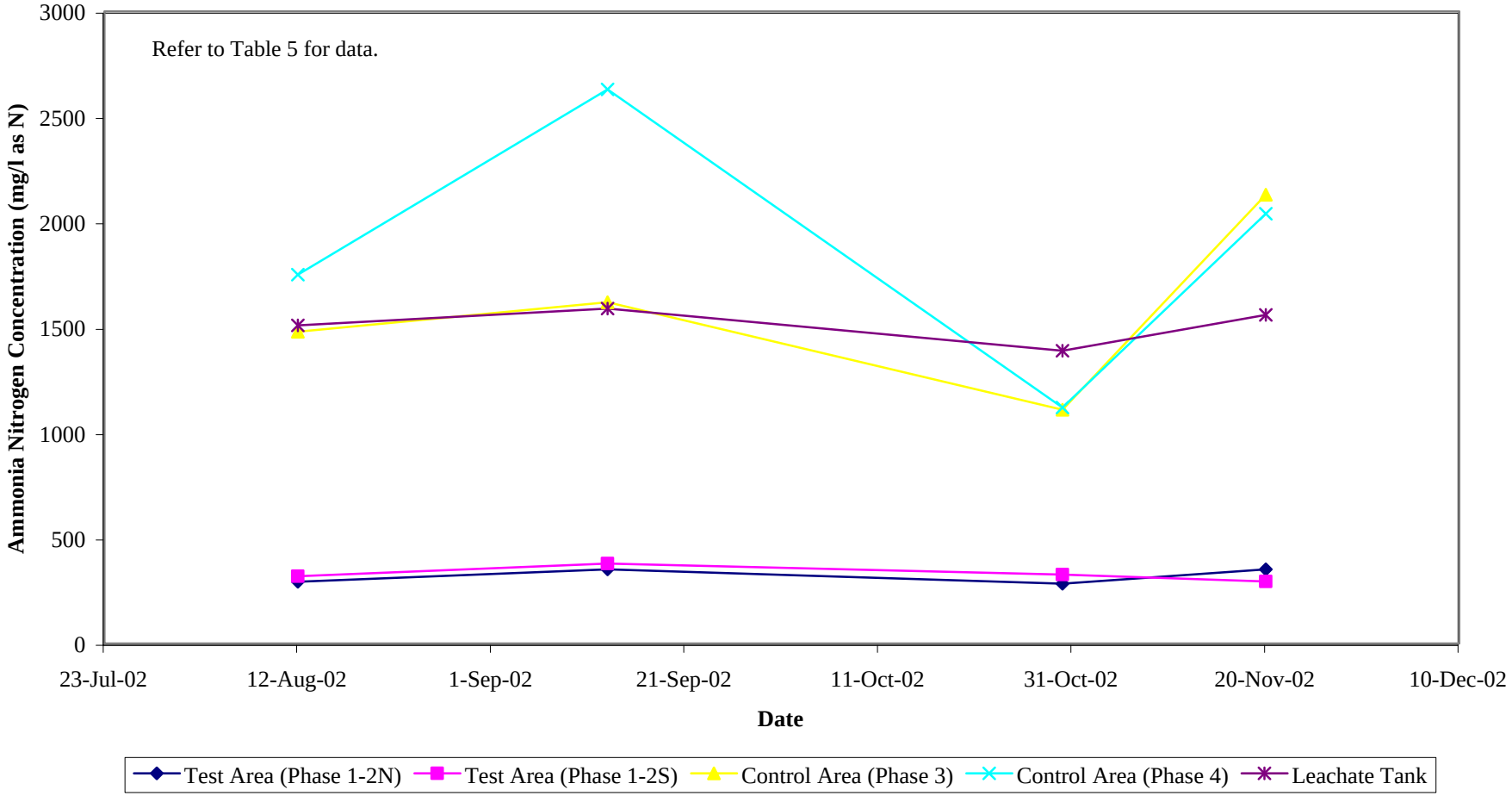


FIGURE 8
LANDFILL GAS QUANTITY DATA
Project XL
Maplewood Recycling and Waste Disposal Facility
Amelia County, Virginia

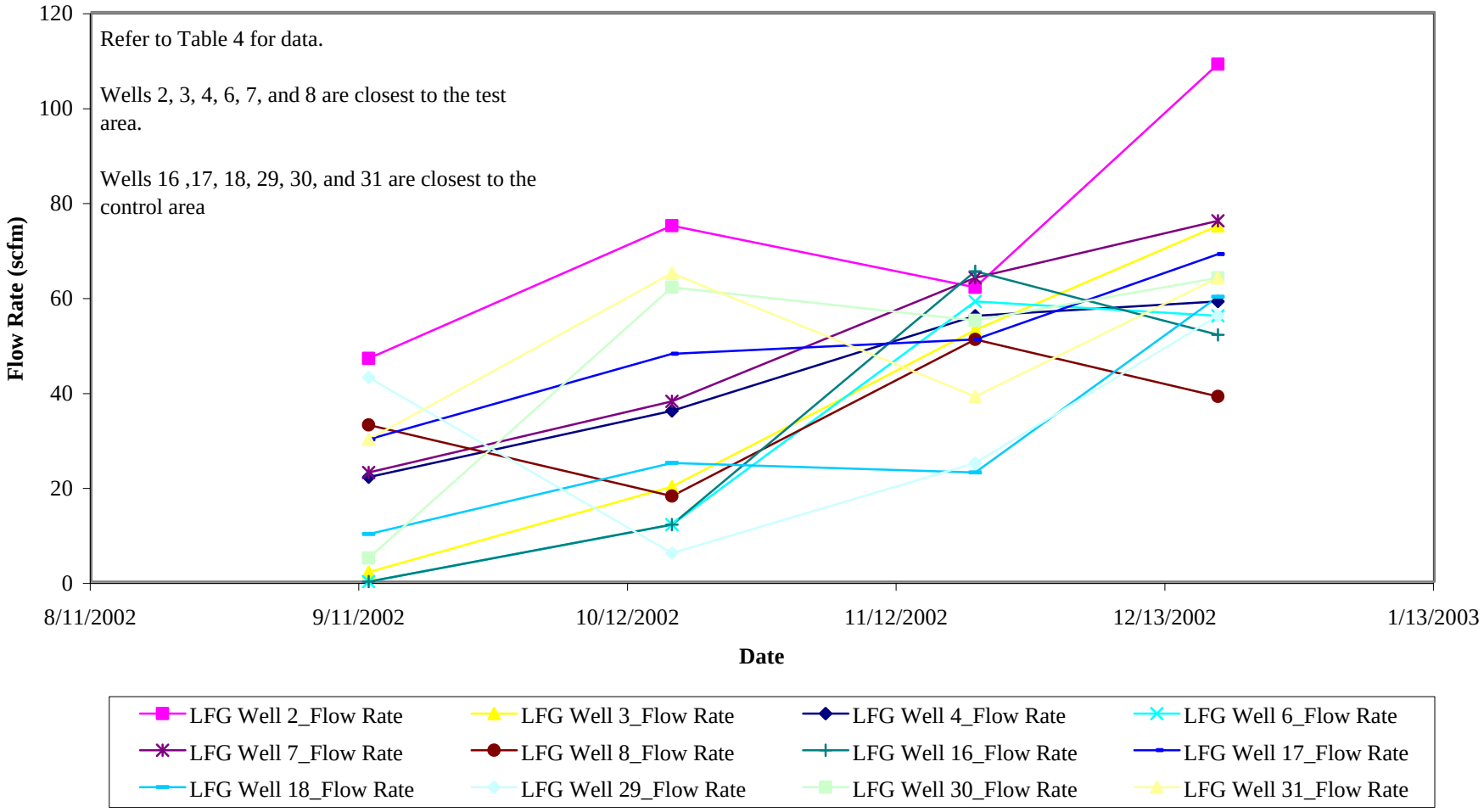


FIGURE 9
LANDFILL GAS QUALITY DATA - METHANE
Maplewood Recycling and Waste Disposal Facility
Amelia County, Virginia

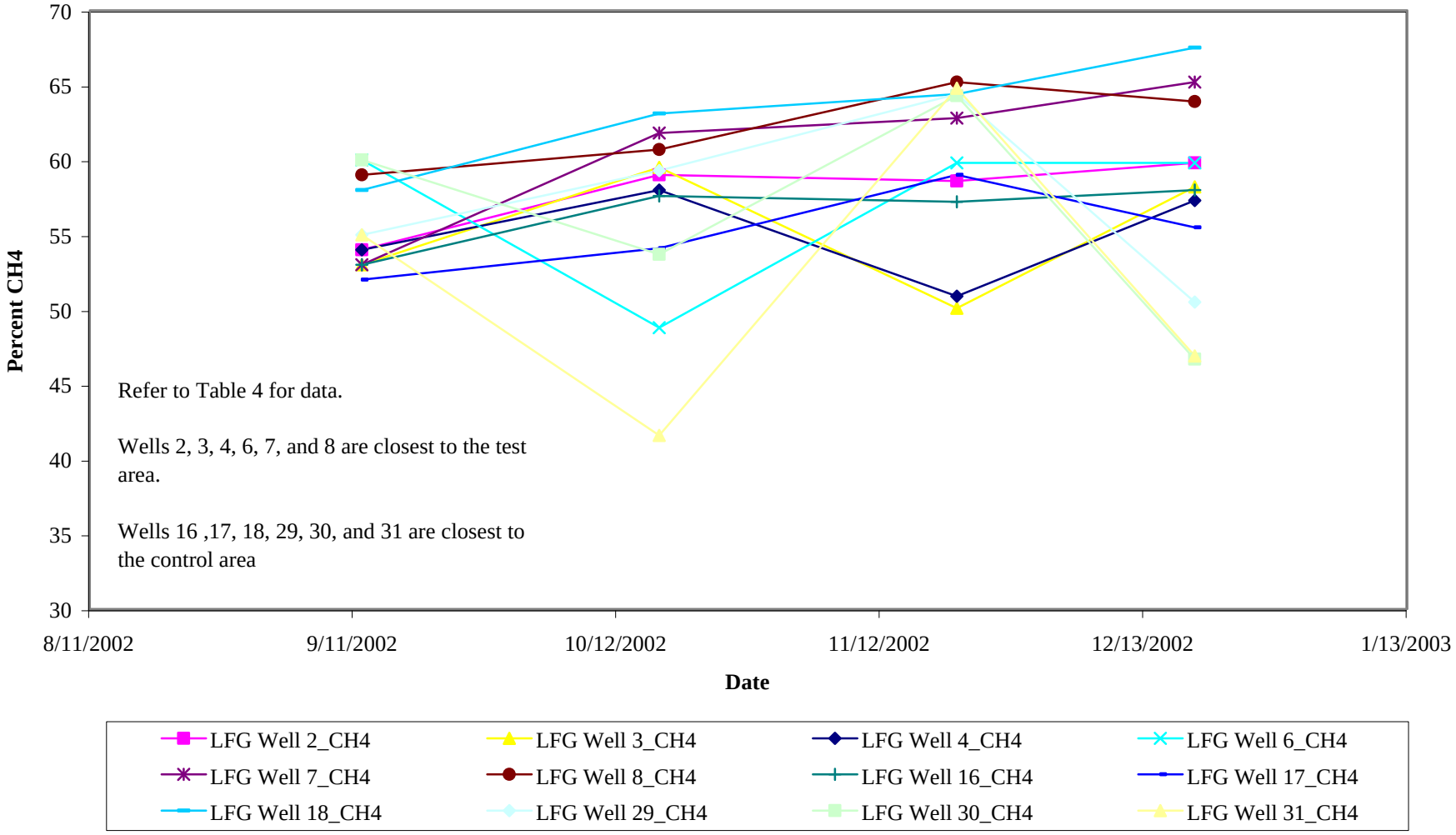
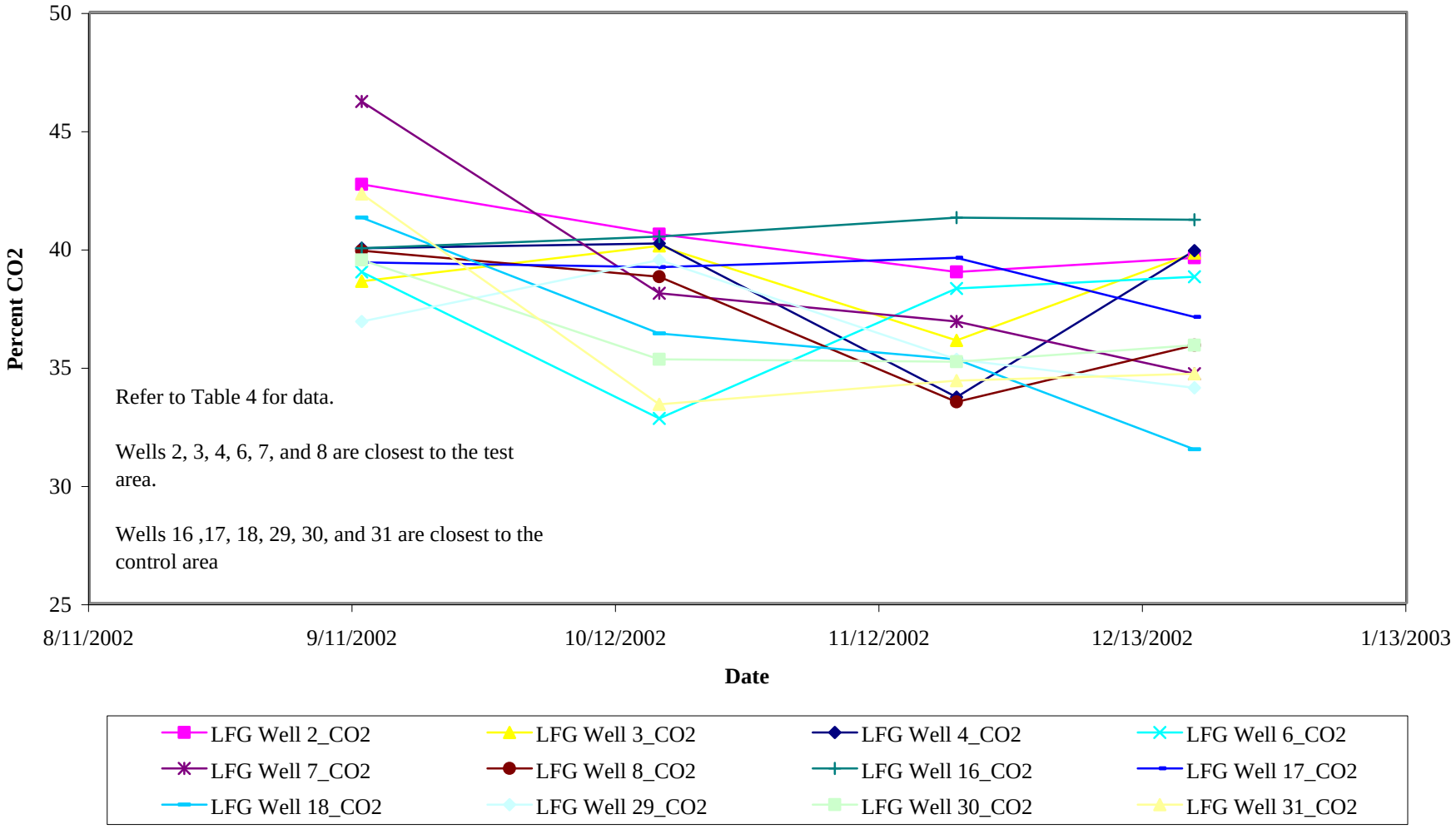
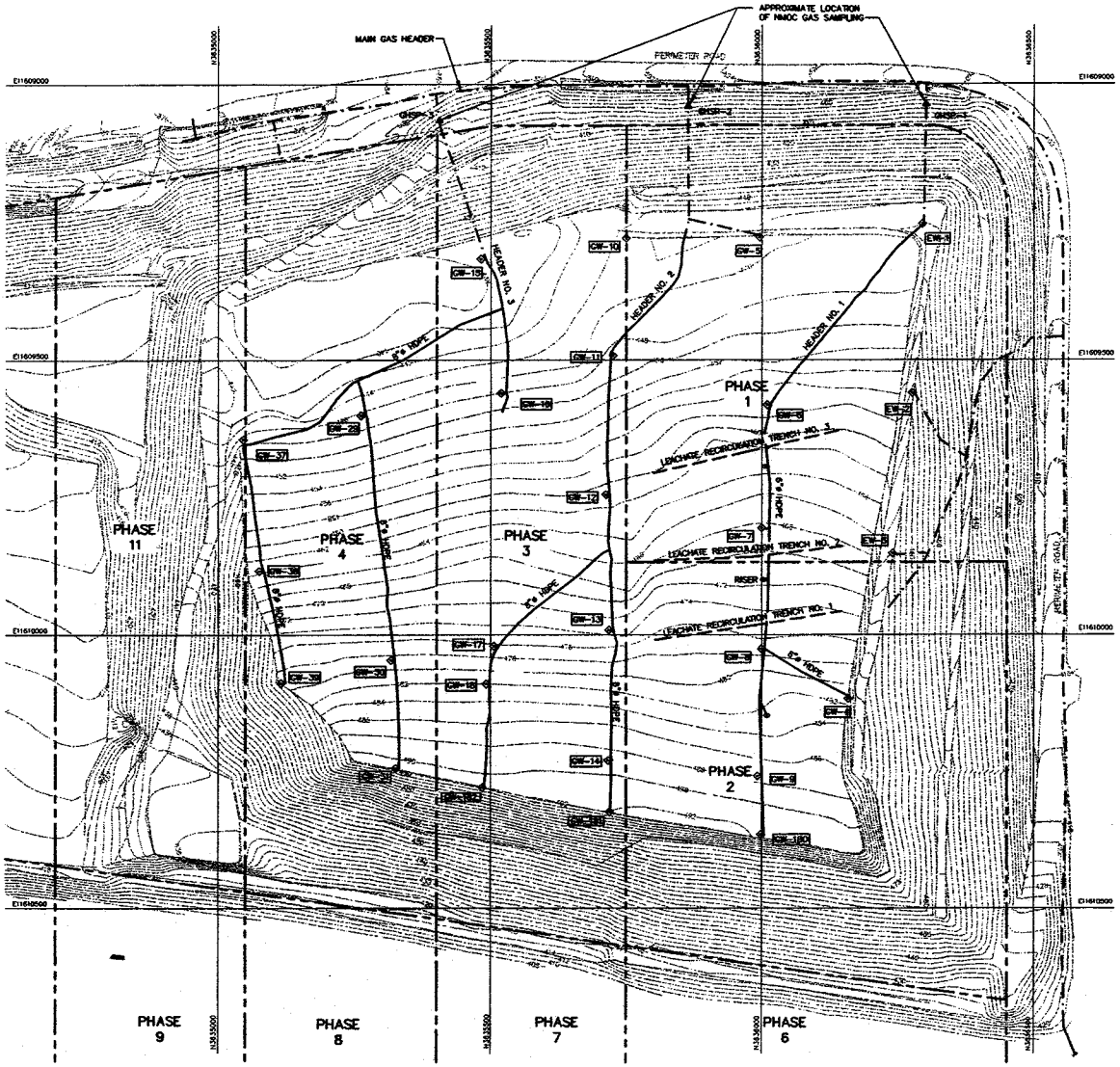


FIGURE 10
LANDFILL GAS QUALITY DATA - CARBON DIOXIDE
Maplewood Recycling and Waste Disposal Facility
Amelia County, Virginia





NORTH

LEGEND

- PHASE BOUNDARY
- 460 EXISTING GRADE CONTOUR (FEET, MSL)
- LEACHATE GAS COLLECTION HEADER
- LANDFILL GAS COLLECTION LATERAL
- GW-5 LANDFILL GAS WELL
- RISER PIPE
- GHSP-1 GAS HEADER SAMPLING POINT

NOTES:

1. TOPOGRAPHIC INFORMATION IS FROM AN ELECTRONIC FILE BY FLORA SURVEYING ASSOCIATES, INC OF A SURVEY CONDUCTED ON 24 APRIL 2002.
1. LANDFILL GAS INFORMATION (WELLS, TRENCHES, PIPING, ETC) IS FROM AN ELECTRONIC FILE FROM FLORA SURVEYING ASSOCIATES, INC. OF A SURVEY CONDUCTED IN SEPTEMBER 2002.

100 50 0 100 200
SCALE: 1" = 100'

GeoSyntec Consultants
COLUMBIA, MARYLAND

REV.	DATE	DESCRIPTION	DR BY	APP BY

DATE: NOVEMBER 2002 | PROJECT NO. ME0275-01 | SCALE: 1" = 100'

DES BY	DTM	NOV 02
DRN BY	JDC	NOV 02
CHK BY	MFH	NOV 02
REV BY		
APP BY		

PROJECT: XL PROJECT
MAPLEWOOD LANDFILL

SHEET TITLE: LANDFILL GAS MONITORING PLAN

SIGNATURE
DATE

WASTE MANAGEMENT, INC.

FILE NO: 0275-002
DRAWING NO: 2 OF 4

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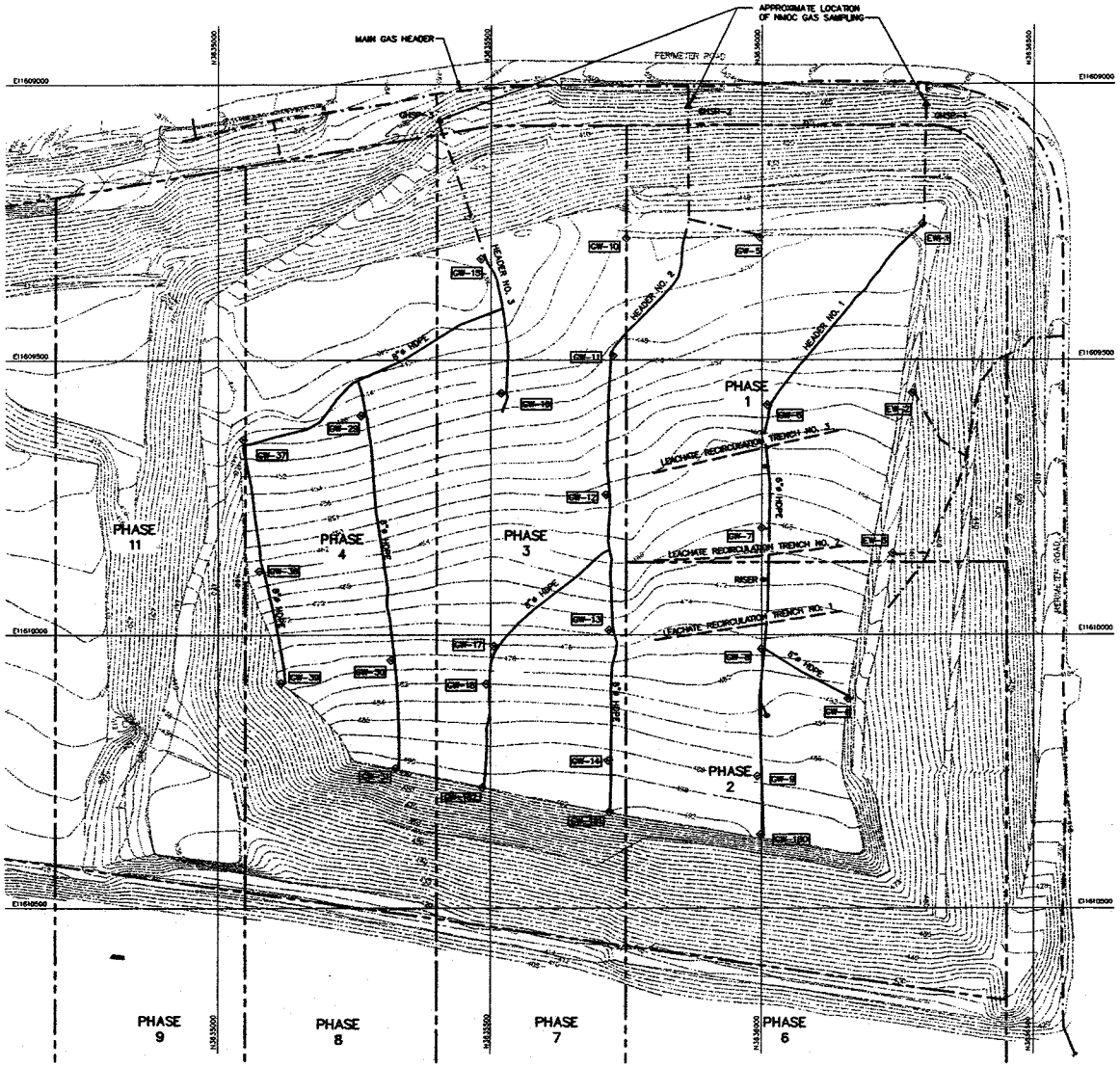


NORTH

LEGEND

- PHASE BOUNDARY
- 460 EXISTING GRADE CONTOUR (FEET, MSL)
- LEACHATE GAS COLLECTION HEADER
- LANDFILL GAS COLLECTION LATERAL
- GW-5 LANDFILL GAS WELL
- RISER PIPE
- GHSP-1 GAS HEADER SAMPLING POINT

NOTES:

1. TOPOGRAPHIC INFORMATION IS FROM AN ELECTRONIC FILE BY FLORA SURVEYING ASSOCIATES, INC OF A SURVEY CONDUCTED ON 24 APRIL 2002.
1. LANDFILL GAS INFORMATION (WELLS, TRENCHES, PIPING, ETC) IS FROM AN ELECTRONIC FILE FROM FLORA SURVEYING ASSOCIATES, INC. OF A SURVEY CONDUCTED IN SEPTEMBER 2002.

100 50 0 100 200
SCALE: 1" = 100'

GeoSyntec Consultants
COLUMBIA, MARYLAND

REV.	DATE	DESCRIPTION	DR BY	APP BY

DATE: NOVEMBER 2002 | PROJECT NO. ME0275-01 | SCALE: 1" = 100'

DES BY	DTM	NOV 02
DRN BY	JDC	NOV 02
CHK BY	MFH	NOV 02
REV BY		
APP BY		

PROJECT: XL PROJECT
MAPLEWOOD LANDFILL

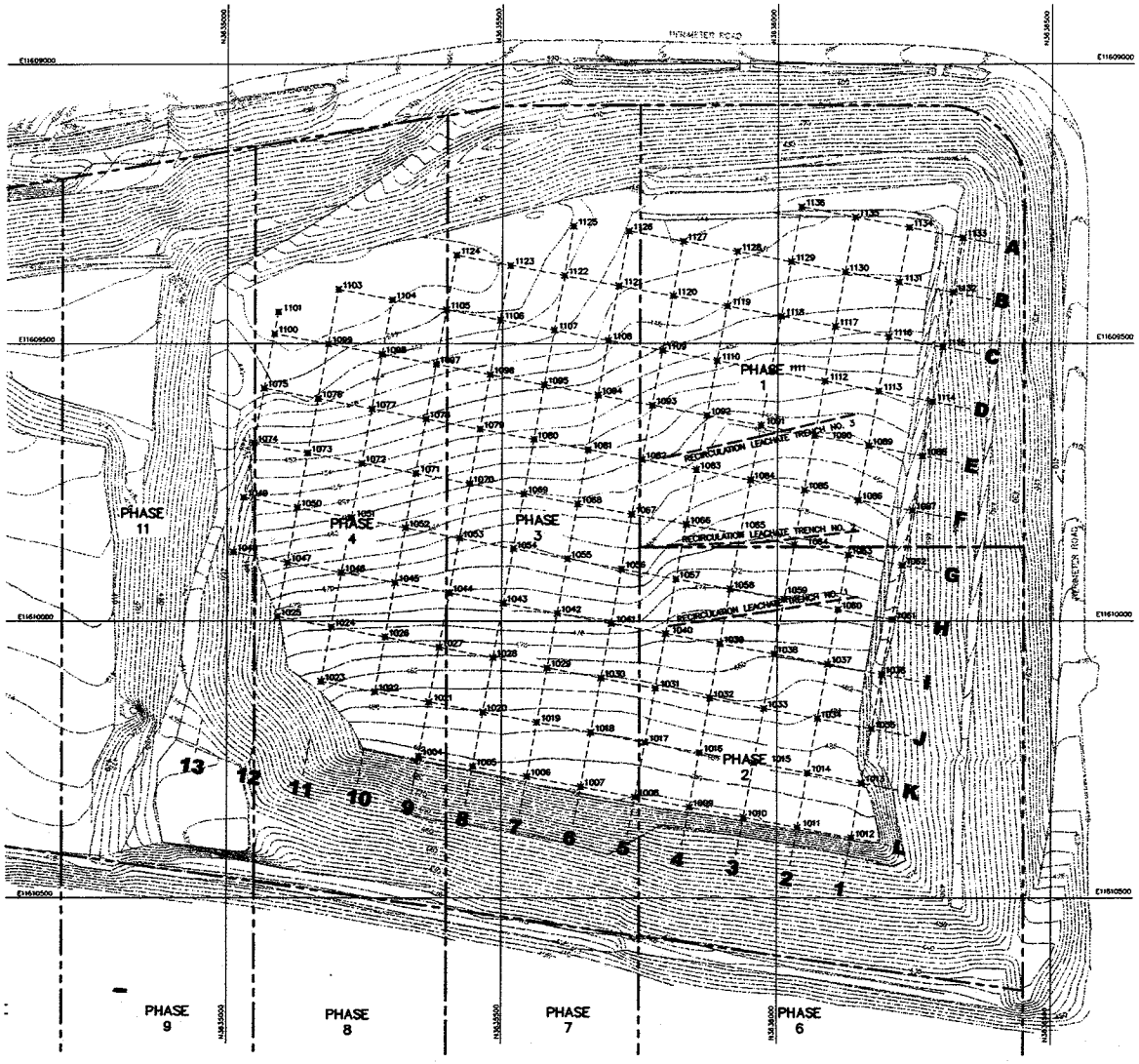
SHEET TITLE: LANDFILL GAS MONITORING PLAN

SIGNATURE
DATE

WASTE MANAGEMENT, INC.

FILE NO: 0275-002
DRAWING NO: 2 OF 4

P:\cadd\0275\0275-002.dwg Fri May 02 08:20:44 2003 GeoSyntec Consultants, MD (DTM)



NORTH

LEGEND

- PHASE BOUNDARY
- 450 EXISTING GRADE CONTOUR (FEET, MSL)
- A SETTLEMENT GRID
- 1130 SETTLEMENT GRID POINT NUMBER

SETTLEMENT POINT SCHEDULE (SEE NOTE 2)

POINT NO.	ELEV. 8/2/02	ELEV. 10/24/02	POINT NO.	ELEV. 8/2/02	ELEV. 10/24/02
1004	485.87	485.39	1070	457.70	457.48
1005	485.31	485.04	1071	453.12	453.02
1006	486.10	487.72	1072	451.48	451.32
1007	488.08	488.77	1073	448.58	448.36
1008	488.28	488.21	1074	448.55	448.41
1009	489.94	489.75	1075	439.54	439.45
1010	488.86	488.80	1076	440.47	440.46
1011	490.38	490.18	1077	445.99	445.91
1012	490.32	490.16	1078	448.91	448.78
1013	488.99	488.87	1079	451.72	451.54
1014	487.29	487.11	1080	452.68	452.25
1015	486.71	486.52	1081	455.31	455.09
1016	485.21	484.90	1082	458.39	458.26
1017	486.48	486.30	1083	456.15	456.05
1018	486.24	485.98	1084	463.12	463.12
1019	484.57	484.27	1085	464.37	464.35
1020	483.05	482.72	1086	463.55	463.49
1021	482.36	481.94	1087	463.11	463.11
1022	480.97	480.59	1088	462.28	462.26
1023	477.72	477.37	1089	461.07	461.07
1024	472.04	471.74	1090	460.16	460.16
1025	468.72	468.35	1091	458.71	458.71
1026	474.39	474.05	1092	455.39	455.32
1027	475.71	475.39	1093	453.50	453.01
1028	477.62	477.39	1094	450.59	450.51
1029	479.07	478.85	1095	447.01	446.77
1030	480.72	480.53	1096	445.63	445.63
1031	481.41	481.18	1097	444.65	444.58
1032	481.09	480.85	1098	440.68	440.57
1033	482.03	482.03	1099	437.66	437.37
1034	482.34	482.28	1100	435.45	435.41
1035	477.76	477.84	1101	434.95	434.82
1036	473.03	472.87	1102	434.51	434.30
1037	476.70	476.52	1103	435.96	435.88
1038	475.69	475.55	1104	438.43	438.32
1039	478.49	478.49	1105	439.74	439.74
1040	476.24	476.24	1106	440.56	440.34
1041	472.92	472.85	1107	444.53	444.34
1042	472.03	471.81	1108	447.00	446.86
1043	471.62	470.75	1109	448.89	448.53
1044	470.05	469.89	1110	449.89	449.53
1045	468.67	467.72	1111	452.44	452.44
1046	466.01	464.78	1112	455.21	455.21
1047	461.57	461.29	1113	455.94	455.94
1048	462.50	462.28	1114	457.94	457.94
1049	462.53	462.46	1115	462.17	462.17
1050	454.78	454.55	1116	450.04	450.04
1051	457.83	457.69	1117	449.09	449.09
1052	460.81	460.65	1118	448.42	448.42
1053	463.32	462.88	1119	447.08	447.08
1054	465.71	465.18	1120	442.72	442.72
1055	466.08	465.78	1121	443.54	443.45
1056	464.95	464.84	1122	438.75	438.61
1057	468.79	468.65	1123	438.73	438.49
1058	470.40	470.33	1124	438.79	438.73
1059	471.87	471.67	1125	437.70	437.58
1060	473.09	473.02	1126	441.84	441.84
1061	468.96	468.84	1127	442.36	442.19
1062	468.12	468.11	1128	443.66	443.66
1063	468.41	468.33	1129	446.21	446.29
1064	468.28	468.21	1130	446.79	446.79
1065	468.68	468.63	1131	446.82	446.67
1066	463.09	463.00	1132	446.82	446.62
1067	463.21	463.04	1133	443.94	443.93
1068	461.01	460.87	1134	447.32	447.32
1069	460.16	460.00	1135	447.36	447.30
			1136	445.01	445.01

NOTES:

1. TOPOGRAPHIC INFORMATION IS FROM AN ELECTRONIC FILE BY FLORA SURVEYING OF A SURVEY CONDUCTED ON 24 APRIL 2002.
2. ELEVATIONAL DATA PROVIDED BY FLORA SURVEYING ASSOCIATE, INC. BASED ON FIELD SURVEYS CONDUCTED ON 2 AUGUST 2002 AND 24 OCTOBER 2002.

100 50 0 100 200
SCALE: 1" = 100'

GeoSyntec Consultants
COLUMBIA, MARYLAND (410)381-4333

REV.	DATE	DESCRIPTION	DR BY	APP BY

DATE: NOVEMBER 2002 | PROJECT NO. ME0275-1 | SCALE: 1" = 100'

DES BY	DTM	NOV 02
DRN BY	JDC	NOV 02
CHK BY	MFH	NOV 02
REV BY		
APP BY		

PROJECT: XL PROJECT
MAPLEWOOD LANDFILL

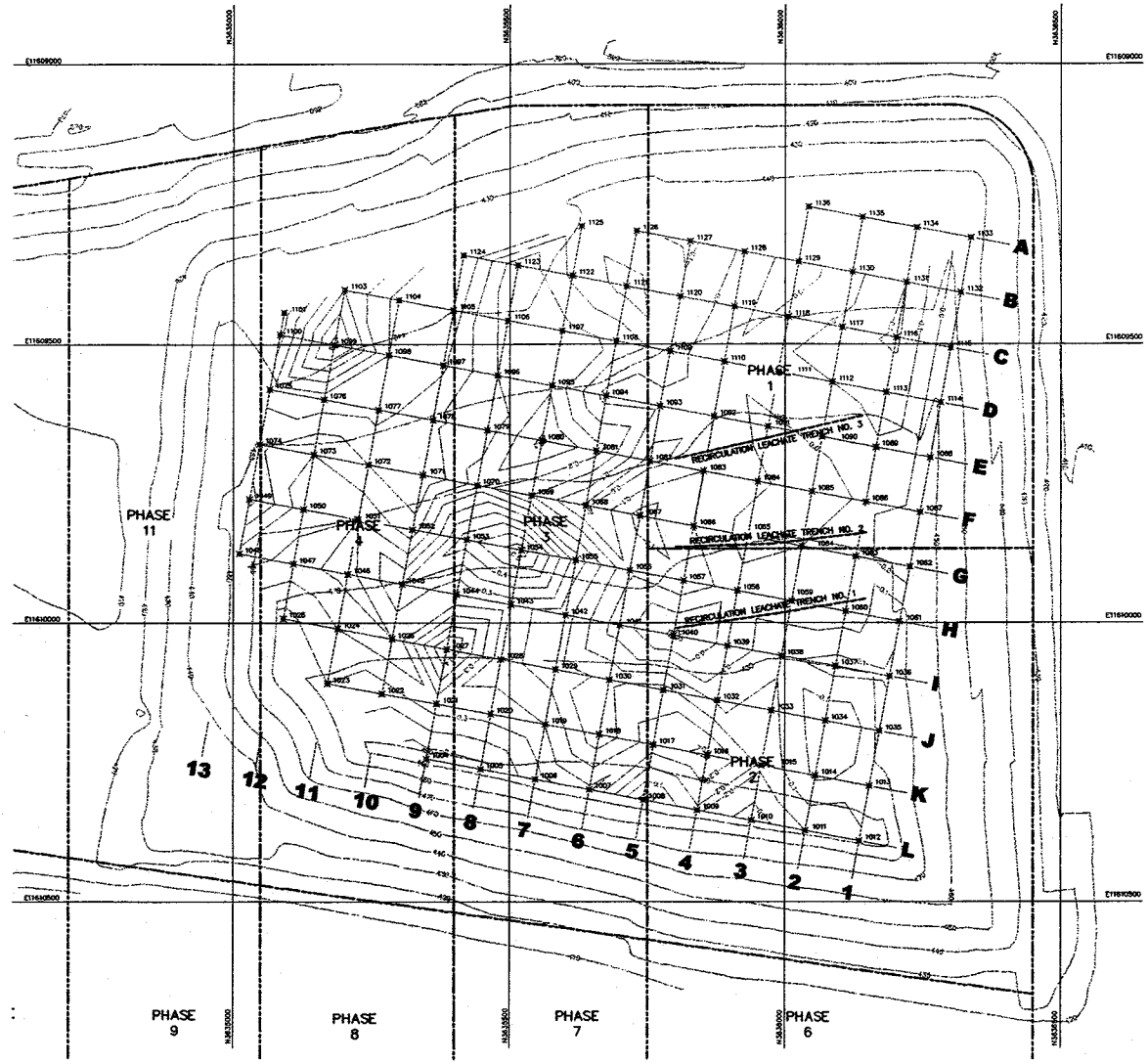
SHEET TITLE: SETTLEMENT MONITORING PLAN

SIGNATURE

DATE

WASTE MANAGEMENT, INC.

FILE NO: 0275-003
DRAWING NO: 3 OF 4



NORTH

LEGEND

- PHASE BOUNDARY
- 440 — EXISTING GRADE CONTOUR (FEET, MSL)
- A — SETTLEMENT GRID
- ✱ 1130 SETTLEMENT GRID POINT NUMBER

SETTLEMENT SCHEDULE (SEE NOTE 2)

POINT NO.	SETTLEMENT 8/02–10/24 (FEET)	POINT NO.	SETTLEMENT 8/02–10/24 (FEET)
1004	-0.46	1070	-0.32
1005	-0.47	1071	-0.10
1006	-0.37	1072	-0.15
1007	-0.39	1073	-0.20
1008	-0.08	1074	-0.14
1009	-0.19	1075	-0.06
1010	-0.28	1076	-0.07
1011	-0.30	1077	-0.06
1012	-0.16	1078	-0.14
1013	-0.12	1079	-0.16
1014	-0.09	1080	-0.31
1015	-0.19	1081	-0.22
1016	-0.31	1082	-0.03
1017	-0.28	1083	-0.06
1018	-0.16	1084	-0.06
1019	-0.30	1085	-0.02
1020	-0.33	1086	0.08
1021	-0.32	1087	0.08
1022	-0.36	1088	0.08
1023	-0.35	1089	0.08
1024	-0.36	1090	0.08
1025	-0.57	1091	-0.22
1026	-0.55	1092	-0.57
1027	-0.59	1093	-0.08
1028	-0.27	1094	-0.08
1029	-0.22	1095	-0.24
1030	-0.08	1096	-0.20
1031	-0.22	1097	-0.20
1032	-0.14	1098	-0.20
1033	0.08	1099	-0.20
1034	-0.08	1100	-0.03
1035	-0.12	1101	-0.03
1036	-0.16	1102	-0.08
1037	-0.17	1103	0.08
1038	-0.14	1104	0.08
1039	0.08	1105	-0.12
1040	-0.57	1106	-0.12
1041	-0.07	1107	-0.12
1042	-0.08	1108	-0.12
1043	-0.57	1109	-0.12
1044	-0.08	1110	0.08
1045	-0.08	1111	0.08
1046	-0.22	1112	0.08
1047	-0.27	1113	0.08
1048	-0.22	1114	0.08
1049	-0.08	1115	-0.16
1050	-0.33	1116	0.08
1051	-0.39	1117	0.08
1052	-0.37	1118	0.08
1053	-0.43	1119	0.08
1054	-0.53	1120	-0.08
1055	-0.28	1121	-0.14
1056	-0.11	1122	-0.24
1057	-0.14	1123	-0.08
1058	-0.07	1124	-0.12
1059	0.08	1125	0.08
1060	-0.07	1126	-0.16
1061	-0.14	1127	0.08
1062	-0.08	1128	0.08
1063	-0.07	1129	-0.02
1064	-0.05	1130	0.08
1065	-0.03	1131	-0.15
1066	0.08	1132	0.08
1067	-0.17	1133	-0.08
1068	-0.04	1134	0.08
1069	-0.15	1135	0.08
		1136	0.08

NOTES:

1. TOPOGRAPHIC INFORMATION IS FROM AN ELECTRONIC FILE BY FLORA SURVEYING OF A SURVEY CONDUCTED ON 24 APRIL 2002.
2. SETTLEMENT VALUES DETERMINED FROM ELEVATIONAL DATA PROVIDED BY FLORA SURVEYING ASSOCIATE, INC. BASED ON FIELD SURVEYS CONDUCTED ON 2 AUGUST 2002 AND 24 OCTOBER 2002.

100 50 0 100 200
SCALE: 1" = 100'

GeoSyntec Consultants
COLUMBIA, MARYLAND (410)381-4333

REV.	DATE	DESCRIPTION	DR BY	APP BY

DATE: NOVEMBER 2002 | PROJECT NO. ME0275-1 | SCALE: 1" = 100'

DES BY	DTM	NOV 02
DRN BY	JOC	NOV 02
CHK BY	MFH	NOV 02
REV BY		
APP BY		

PROJECT: XL PROJECT MAPLEWOOD LANDFILL

SHEET TITLE: SETTLEMENT MONITORING PLAN

SIGNATURE

DATE

WASTE MANAGEMENT, INC.

FILE NO. 0275-004

DRAWING NO: 4 OF 4

APPENDIX A - LEACHATE QUALITY TEST RESULTS
(available upon request)

APPENDIX B - DAILY LIQUID APPLICATION LOG
(available upon request)

APPENDIX C - TRENCH MONITORING LOG
(available upon request)

APPENDIX D - SETTLEMENT D
(available upon request)

APPENDIX E - LANDFILL GAS DATA
(summary data included, complete data available upon request)

Golder Associates Inc.

3701 Saunders Avenue
Richmond, VA USA 23227
Telephone (804) 358-7900
Fax (804) 358-2900

Golder Associates

September 30, 2002

Waste Management
Maplewood Recycling and Disposal Facility
P.O. Box 168
Amelia, Virginia 23002

Proj# 023-6780

Attn: Brian McClung, District Manager

Re: **NSPS Surface Emissions Monitoring Event, Project XL**
Maplewood Recycling and Waste Disposal Facility

Dear Mr.McClung:

Golder Associates Inc. (Golder), performed an NSPS Surface Emissions Monitoring Event at the Maplewood site, located in Amelia, Virginia on September 12, 2002. The Monitoring event was associated with the XL project and was conducted in accordance with guidelines set forth in the New Source Performance Standards (NSPS), 40 CFR 60.755 (c) and (d) and 40 CFR 60, Appendix A, Method 21.

Field Monitoring

Golder was provided with a Surface Emissions Monitoring Plan detailing topography, Landfill Gas (LFG) extraction system details and surface emission monitoring traverse locations, as a reference document.

The Golder technician utilized a MicroFID Organic Vapor Analyzer (SN# CZJJ337), meeting Method 21 requirements. The instrument was calibrated in the field in accordance with Method 21. Calibration Tables can be found in Attachment A of this summary report.

Site Specific Summary

The Golder technician monitored the landfill surface along the site-specific traverse pattern and at areas suspected of exceeding 500 ppm above background of methane gas based on visual observation.

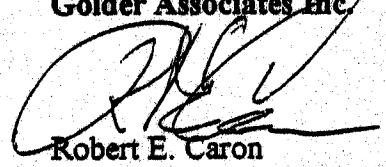
Two exceedances (> 500 ppm) were found during this event. Golder requested additional soil cover and re-grading at both of these areas. Re-monitoring of those areas on the same date after the soil cover had been placed resulted in no exceedances.

Attachments to this summary report include photographs, information regarding monitoring dates, background and exceedance measurements and equipment and calibration data. A site-specific map showing the two (2) exceedance locations is also attached.

Thank you for this opportunity for Golder to provide monitoring services for Waste Management. Feel free to contact me at any time at 804-358-7900 if you have any questions regarding this summary report.

Sincerely,

Golder Associates Inc.



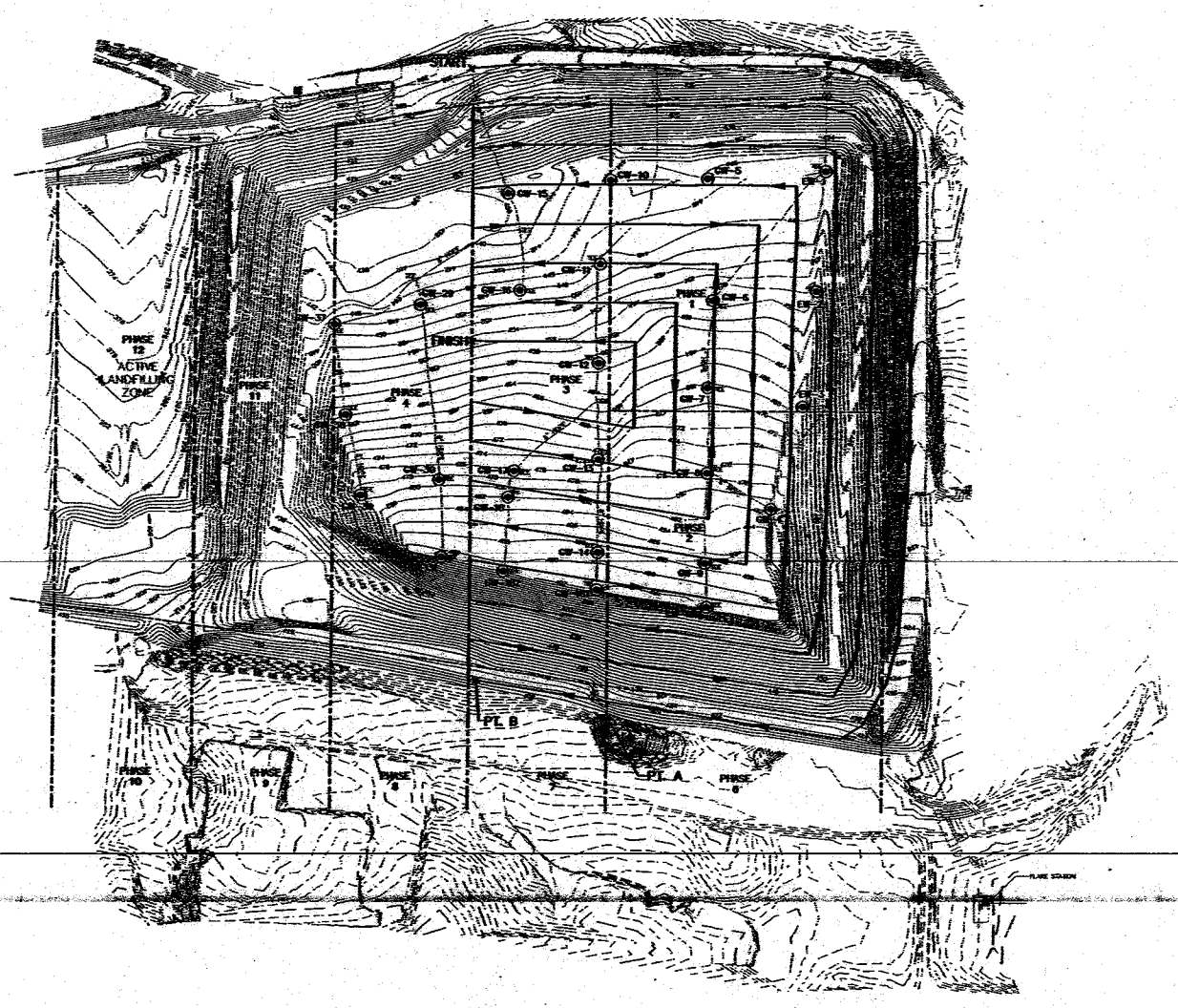
Robert E. Caron
Project Manager

C.C.: J. Stenborg, P.E.
D. Mandeville, Geosyntec

Project XL Landfill Gas Monitoring
Maplewood Recycling and Waste Disposal Facility

Date 9/12/2002 Time 10:00am

Well ID	Temperature (degrees F)	Flowrate (scfm)	CH_4 %	CO_2 %	O_2 %	Balance
1	95	19	53		0.6	6.8
2	98	47	54		0.9	2.4
3	115	2	53		0.6	7.8
4	98	22	54		0.4	5.6
5	97	6	52		1.9	7
6	100	0	60		0.5	0.5
7	110	23	53		0.8	0
8	115	33	59		1.1	0
9	110	31	60		0.4	0
10	109	40	50		1	8
11	119	25	58		0.3	0
12	115	35	61		0.4	0
13	110	40	60		0.5	0
14	109	19	56		1	1.1
15	111	22	54		0.6	4.8
16	90	0	53		1.7	5.3
17	90	30	52		0.8	7.8
18	109	10	58		0.7	0
29	105	43	55		2.1	6
30	105	5	60		0.5	0
31	100	30	55		0.9	1.8
37	101	58	60		1	0
38	110	49	55		2.1	7.1
39	101	88	56		0.8	2.7
41	112	52	44		0.8	19
42	98	29	55		0.6	2.3
53	88	48	48		0.2	15
54						



LEGEND

- START x—— SAMPLING ROUTE
- EXISTING 2 FT. CONTOURS
- EXISTING 10 FT CONTOURS
- GW-15 LANDFILL GAS EXTRACTION WELL (APPROXIMATE LOCATION)
- PT. A x EXCEEDANCE POINT

GENERAL NOTES

1. SITE PLAN SHOWS INFORMATION FROM FIELD DATA PROVIDED BY DRAPER ADEN ASSOCIATES, GLEN ALLEN, VA, ORGANIC WASTE TECHNOLOGIES, INC., MIDDLEBURG HTS, OH, AND FLORA SURVEYING ASSOCIATES, PC, GLOUCESTER, VA.
2. LOCATIONS OF MONITORING POINTS ARE APPROXIMATE AND MAY BE ADJUSTED TO ACCOMMODATE FIELD CONDITIONS.
3. THE "ACTIVE LANDFILLING ZONE" IS CONSIDERED A DANGEROUS AREA AND IS EXCLUDED FROM MONITORING PER 40 CFR 60.753(d).

DATE	REVISIONS AND RECORD OF ISSUE	NO	BY	CK	APP
	TOPOGRAPHY 8-7-00				

DESIGNED
DRAWN CADD
CHECKED
APPROVED
DATE 3/13/02

FORCE ENGINEERING, INC.
4600 RADFORD AVENUE
RICHMOND, VA 23230-3506
PHONE: (804) 355-4520

SCALE	PROJECT NO.	DRAWING NO.
1"=300'	448.20	1

WASTE MANAGEMENT, INC.– MAPLEWOOD RECYCLING AND WASTE DISPOSAL FACILITY
AMELIA COUNTY, VIRGINIA
SURFACE EMISSIONS MONITORING PLAN – 1st QUARTER 2002

ATTACHMENT A
TABLE 4
DAILY SURFACE MONITORING LOG

PERFORMED BY: Robert E. Caron

START TIME: 09:30 AM PM

DATE: September 12, 2002

LANDFILL NAME: Maplewood Recycling and Waste Disposal Facility

Location Identifier of Leak	Time of Detection	Concentration of Leak (PPM)
1	11:25	699
2	11:28	1200

Project XL: September 2002

Landfill Name: Maplewood Recycling and Waste Disposal Facility

ATTACHMENT A
TABLE 5
Exceedance and Monitoring Logs

Initial Monitoring Event		1st Re-Mon Event 10- Days			2nd Re-Mon Event 10-Days			3rd Re-Mon Event 10-Days			1st Follow-up: 30 Days			Comments		
Exceedance Location No.	Monitoring Date	Monitoring Date	No Ex. <500 ppm	Ex. >500 ppm	Monitoring Date	No Ex. <500 ppm	Ex. >500 ppm	Monitoring Date	No Ex. <500 ppm	Ex. >500 ppm	Monitoring Date	No Ex. <500 ppm	Ex. >500 ppm			
~~1~~	~~9/12/2002~~	~~9/12/2002~~	~~x~~													
2	9/12/2002	9/12/2002	x													

Golder Associates Inc.

3701 Saunders Avenue
Richmond, VA USA 23227
Telephone (804) 358-7900
Fax (804) 358-2900

Golder Associates

October 28, 2002

Waste Management
Maplewood Recycling and Disposal Facility
P.O. Box 168
Amelia, Virginia 23002

Proj# 023-6780

Attn: Brian McClung, District Manager

Re: **Wellfield, LFG Sampling, H2S Monitoring and NSPS Surface Emissions Monitoring Event, Project XL**
Maplewood Recycling and Waste Disposal Facility

Dear Mr.McClung:

Golder Associates Inc. (Golder) performed technical services in support of the Project XL leachate recirculation activity at the Maplewood Recycling and Waster Disposal Facility site located in Amelia County, Virginia on October 17 and 18, 2002. The effort included a NSPS Surface Emissions Monitoring Event and was conducted in accordance with guidelines set forth in the New Source Performance Standards (NSPS), 40 CFR, 60.755 (c) and (d) and 40 CFR 60, Appendix A, Method 21.

In addition, pursuant to the Golder proposal # PR7-8392 dated October 4, 2002, Golder, in conjunction with WM, collected a full round of monitoring data from all active LFG extraction wells as well as monitoring data from all extraction wells and the flare station for the presence of H_2S. Finally, Golder collected LFG gas samples using Summa Canisters at the main header line and at two branch header locations.

Field Monitoring

Golder was provided with a Surface Emissions Monitoring Plan detailing topography, Landfill Gas (LFG) extraction system details and surface emission monitoring traverse locations, as a reference document.

The Golder technician utilized a MicroFID Organic Vapor Analyzer (SN# CZJJ337), meeting Method 21 requirements. The instrument was calibrated in the field in accordance with Method 21. Calibration Tables can be found in Attachment A of this summary report.

Golder assisted WM (Pat McCann) in monitoring all active LFG extraction wells using a GEM 500 owned by WM. During this effort, Golder monitored all LFG extraction wells

and the inlet to the flare using a VRAE specific gas monitor calibrated to a known standard for H2S.

Site Specific Summary

The Golder technician monitored the landfill surface along the site-specific traverse pattern and at areas suspected of exceeding 500 ppm above background of methane gas based on visual observation.

No exceedances (> 500 ppm) were found during this event.

LFG extraction well monitoring data for October 17, 2002 to include H2S at each wellhead is attached to this summary.

Golder collected four (4) Summa Canister samples of LFG at the following locations:

- Blower Discharge
- Sample Point #1 from Cells 1 & 2 North
- Sample Point #2 from Cells 1 & 2 South
- Sample Point #3 from Cells 3 & 4

Sampling was performed using a pre-prepared evacuated Summa Canisters provided by Triangle Environmental Services. The Blower Flare System was turned off in order to facilitate sample collection. Each Canister was filled using Teflon hose routed through a flow meter at a rate of 60-80 cc/min until zero pressure was reached and no flow was measured.

Attachments to this summary report include, information regarding monitoring dates, monitoring data, background and exceedance measurements, equipment and calibration data and a copy of the Chain of Custody for the four (4) Summa Canisters samples. A site-specific map showing the traverse patterns is also included.

Thank you for this opportunity for Golder to provide monitoring services for Waste Management. Feel free to contact me at any time at 804-358-7900 if you have any questions regarding this summary report.

Sincerely,

Golder Associates Inc.

Robert E. Caron
Project Manager

C.C.: J. Stenborg, P.E.
D. Mandeville, Geosyntec

Project XL Landfill Gas Monitoring
Maplewood Recycling and Waste Disposal Facility

Date 10/17/2002 Time 11:30

Well ID	Temperature (degrees F)	Flowrate (scfm)	CH_4 %	CO_2 %	O_2 %	Balance
[illegible]	82	37	56.1	40.3	0.2	3.4
[illegible]	87	75	59	40.6	0.4	0
[illegible]	102	20	59.5	40.1	0.4	0
[illegible]	63	36	58	40.2	0.8	1
[illegible]	98	36	59.8	39.7	0.5	0
[illegible]	111	12	48.8	32.8	3.6	14.8
[illegible]	100	38	61.8	38.1	0.1	0
[illegible]	67	18	60.7	38.8	0.5	0
[illegible]	66	45	63.1	36.5	0.4	0
[illegible]	114	55	49.9	33.3	3	13.8
[illegible]	98	48	60.2	39.3	0.5	0
[illegible]	119	54	60.4	39.2	0.4	0
[illegible]	75	61	61.3	38.1	0.6	0
[illegible]	71	36	66.7	33.1	0.2	0
[illegible]	73	49	56.7	41.3	0.4	1.6
[illegible]	94	12	57.6	40.5	0.8	1.1
[illegible]	83	48	54.1	39.2	0.4	6.3
[illegible]	93	25	63.1	36.4	0.5	0
[illegible]	85	6	59.3	39.5	1.2	0
[illegible]	69	62	53.7	35.3	0.5	10.5
[illegible]	89	65	41.6	33.4	0.5	24.5
[illegible]	93	73	66.9	32.5	0.6	0
[illegible]	93	50	58.3	39.1	0.8	1.8
[illegible]	102	52	50	32.8	0.4	16.8
[illegible]	65	45	55	40.9	0.4	3.7
[illegible]	68	55	59.1	40.4	0.5	0
[illegible]	123	44	53.2	36.6	0.4	9.9

ATTACHMENT A
TABLE 4
DAILY SURFACE MONITORING LOG

PERFORMED BY: Robert E. Caron

START TIME: 09:30 AM PM

DATE: October 17, 2002

LANDFILL NAME: Maplewood Recycling and Waste Disposal Facility

Location Identifier of Leak	Time of Detection	Concentration of Leak (PPM)
NO EXCEEDANCES		

Project XL: October 2002

Landfill Name: Maplewood Recycling and Waste Disposal Facility

ATTACHMENT A
TABLE 5
Exceedance and Monitoring Logs

Initial Monitoring Event		1st Re-Mon Event 10- Days			2nd Re-Mon Event 10-Days			3rd Re-Mon Event 10-Days			1st Follow-up: 30 Days			Comments		
Exceedance	Monitoring	Monitoring	No Ex.	Ex.	Monitoring	No Ex.	Ex.	Monitoring	No Ex.	Ex.	Monitoring	No Ex.	Ex.			
Location No.	Date	Date	<500 ppm	>500 ppm	Date	<500 ppm	>500 ppm	Date	<500 ppm	>500 ppm	Date	<500 ppm	>500 ppm			
NO EXCEEDANCES																

Golder Associates Inc.

3701 Saunders Avenue
Richmond, VA USA 23227
Telephone (804) 358-7900
Fax (804) 358-2900

December 11, 2002

Waste Management
Maplewood Recycling and Disposal Facility
P.O. Box 168
Amelia, Virginia 23002

Proj# 023-6780

Attn: Brian McClung, District Manager

Re: **Wellfield, LFG Sampling, H2S Monitoring and NSPS Surface Emissions Monitoring Event, Project XL November 2002**
Maplewood Recycling and Waste Disposal Facility

Dear Mr.McClung:

Golder Associates Inc. (Golder) performed technical services in support of the Project XL leachate recirculation activity at the Maplewood Recycling and Waste Disposal Facility site located in Amelia County, Virginia on November 21, 2002. The effort included a NSPS Surface Emissions Monitoring Event and was conducted in accordance with guidelines set forth in the New Source Performance Standards (NSPS), 40 CFR, 60.755 (c) and (d) and 40 CFR 60, Appendix A, Method 21.

In addition, pursuant to the Golder proposal # PR7-8392 dated October 4, 2002, Golder, in conjunction with WM, collected a full round of monitoring data from all active LFG extraction wells as well as monitoring data from all extraction wells and the flare station for the presence of H_2S. Finally, Golder collected LFG gas samples using Summa Canisters at the main header line and at two branch header locations.

Field Monitoring

Golder was provided with a Surface Emissions Monitoring Plan detailing topography, Landfill Gas (LFG) extraction system details and surface emission monitoring traverse locations, as a reference document.

The Golder technician utilized a MicroFID Organic Vapor Analyzer (SN# CZJG303), meeting Method 21 requirements. The instrument was calibrated in the field in accordance with Method 21. Calibration Tables can be found in Attachment A of this summary report.

Golder assisted WM (Pat McCann) in monitoring all active LFG extraction wells using a GEM 2000 owned by WM. During this effort, Golder monitored all LFG extraction

wells and the inlet to the flare using a VRAE specific gas monitor calibrated to a known standard for H2S.

Site Specific Summary

The Golder technician monitored the landfill surface along the site-specific traverse pattern and at areas suspected of exceeding 500 ppm above background of methane gas based on visual observation.

No exceedances (> 500 ppm) were found during this event.

LFG extraction well monitoring data for November 21, 2002 to include H2S at each wellhead is attached to this summary.

Golder collected four (4) Summa Canister samples of LFG at the following locations:

- Blower Discharge
- Sample Point #1 from Cells 1 & 2 North
- Sample Point #2 from Cells 1 & 2 South
- Sample Point #3 from Cells 3 & 4

Sampling was performed using a pre-prepared evacuated Summa Canisters provided by Triangle Environmental Services. The Blower Flare System was turned off in order to facilitate sample collection. Each Canister was filled using Teflon hose routed through a flow meter at a rate of 60-80 cc/min until zero pressure was reached and no flow was measured.

Attachments to this summary report include, information regarding monitoring dates, monitoring data, background and exceedance measurements, equipment and calibration data and a copy of the Chain of Custody for the four (4) Summa Canisters samples. A site-specific map showing the traverse patterns is also included.

Thank you for this opportunity for Golder to provide monitoring services for Waste Management. Feel free to contact me at any time at 804-358-7900 if you have any questions regarding this summary report.

Sincerely,

Golder Associates Inc.

Robert E. Caron
Project Manager

C.C.: J. Stenborg, P.E.
D. Mandeville, Geosyntec

ATTACHMENT A
TABLE 4
DAILY SURFACE MONITORING LOG

PERFORMED BY: Robert E. Caron

START TIME: 09:30 AM PM

DATE: November 21, 2002

LANDFILL NAME: Maplewood Recycling and Waste Disposal Facility

Location Identifier of Leak	Time of Detection	Concentration of Leak (PPM)
NO EXCEEDANCES		

Project XL:November 2002

Landfill Name: Maplewood Recycling and Waste Disposal Facility

ATTACHMENT A
TABLE 5
Exceedance and Monitoring Logs

Initial Monitoring Event		1st Re-Mon Event 10- Days			2nd Re-Mon Event 10-Days			3rd Re-Mon Event 10-Days			1st Follow-up: 30 Days			Comments		
Exceedance	Monitoring	Monitoring	No Ex.	Ex.	Monitoring	No Ex.	Ex.	Monitoring	No Ex.	Ex.	Monitoring	No Ex.	Ex.			
Location No.	Date	Date	<500 ppm	>500 ppm	Date	<500 ppm	>500 ppm	Date	<500 ppm	>500 ppm	Date	<500 ppm	>500 ppm			
NO EXCEEDANCES																

Golder Associates Inc.

3701 Saunders Avenue
Richmond, VA USA 23227
Telephone (804) 358-7900
Fax (804) 358-2900

January 20, 2003

Waste Management
Maplewood Recycling and Disposal Facility
P.O. Box 168
Amelia, Virginia 23002

Proj# 023-6780

Attn: Brian McClung, District Manager

Re: **Wellfield, LFG Sampling, H2S Monitoring and NSPS Surface Emissions Monitoring Event, Project XL December 2002**
Maplewood Recycling and Waste Disposal Facility

Dear Mr.McClung:

Golder Associates Inc. (Golder) performed technical services in support of the Project XL leachate recirculation activity at the Maplewood Recycling and Waste Disposal Facility site located in Amelia County, Virginia on December 18, 2002. The effort included a NSPS Surface Emissions Monitoring Event and was conducted in accordance with guidelines set forth in the New Source Performance Standards (NSPS), 40 CFR, 60.755 (c) and (d) and 40 CFR 60, Appendix A, Method 21.

In addition, pursuant to the Golder proposal # PR7-8392 dated October 4, 2002, Golder, in conjunction with WM, collected a full round of monitoring data from all active LFG extraction wells as well as monitoring data from all extraction wells and the flare station for the presence of H_2S. Finally, Golder collected LFG gas samples using Summa Canisters at the main header line and at two branch header locations.

Field Monitoring

Golder was provided with a Surface Emissions Monitoring Plan detailing topography, Landfill Gas (LFG) extraction system details and surface emission monitoring traverse locations, as a reference document.

The Golder technician utilized a MicroFID Organic Vapor Analyzer (SN# CZJG303), meeting Method 21 requirements. The instrument was calibrated in the field in accordance with Method 21. Calibration Tables can be found in Attachment A of this summary report.

Golder assisted WM (Pat McCann) in monitoring all active LFG extraction wells using a GEM 2000 owned by WM. During this effort, Golder monitored all LFG extraction

wells and the inlet to the flare using a VRAE specific gas monitor calibrated to a known standard for H2S.

Site Specific Summary

The Golder technician monitored the landfill surface along the site-specific traverse pattern and at areas suspected of exceeding 500 ppm above background of methane gas based on visual observation.

No exceedances (> 500 ppm) were found during this event.

LFG extraction well monitoring data for December 19, 2002 to include H2S at each wellhead is attached to this summary.

Golder collected four (4) Summa Canister samples of LFG at the following locations:

- Blower Discharge
- Sample Point #1 from Cells 1 & 2 North
- Sample Point #2 from Cells 1 & 2 South
- Sample Point #3 from Cells 3 & 4

Sampling was performed using a pre-prepared evacuated Summa Canisters provided by Triangle Environmental Services. The Blower Flare System was turned off in order to facilitate sample collection. Each Canister was filled using Teflon hose routed through a flow meter at a rate of 60-80 cc/min until zero pressure was reached and no flow was measured.

Attachments to this summary report include, information regarding monitoring dates, monitoring data, background and exceedance measurements, equipment and calibration data and a copy of the Chain of Custody for the four (4) Summa Canisters samples. A site-specific map showing the traverse patterns is also included.

Thank you for this opportunity for Golder to provide monitoring services for Waste Management. Feel free to contact me at any time at 804-358-7900 if you have any questions regarding this summary report.

Sincerely,

Golder Associates Inc.

Robert E. Caron
Project Manager

C.C.: J. Stenborg, P.E.
D. Mandeville, Geosyntec

ATTACHMENT A
TABLE 4
DAILY SURFACE MONITORING LOG

PERFORMED BY: Merrill E. Baker III

START TIME: 10:30 AM PM

DATE: December 19, 2002

LANDFILL NAME: Maplewood Recycling and Waste Disposal Facility

Location Identifier Of Leak	Time of Detection	Concentration of Leak (PPM)
1	11:04	993
2	12:03	855

2002 4th Quarter

Landfill Name: Maplewood Recycling and Waste Disposal Facility

ATTACHMENT A
TABLE 5
Exceedance and Monitoring Logs

Initial Monitoring Event		1st Re-Mon Event 10- Days			2nd Re-Mon Event 10-Days			3rd Re-Mon Event 10-Days			1st Follow-up: 30 Days			Comments		
Exceedance Location No.	Monitoring Date	Monitoring Date	No Ex. <500 ppm	Ex. >500 ppm	Monitoring Date	No Ex. <500 ppm	Ex. >500 ppm	Monitoring Date	No Ex. <500 ppm	Ex. >500 ppm	Monitoring Date	No Ex. <500 ppm	Ex. >500 ppm			
1	12/19/2002	12/19/2002	x													
2	12/19/2002	12/19/2002	x													